The magazine for AUSTRALIAN Amateurs

September 2003
Volume 71 No 9

# Amateur Radio

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## An Oscilloscope in the Shack

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— Update of popular 1997 article by Ian Stirling VK3MZ

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# Amateur Radio

*The Journal of the Wireless Institute of Australia*

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Volume 71
Number 9
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**Editor:** Colwyn Low VK5UE
edarmag@chariot.net.au

**Technical Editor:** Peter Gibson VK3AZL



**Publications Committee Members**

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**Submission of material to Amateur Radio Magazine**

General and Technical articles to
Secretary
AR Publications Committee
3 Tamar Court
Mentone VIC 3194
or armag@optusnet.com.au

Columns and Letters to the Editor to
Editor
AR Magazine
34 Hawker Crescent
Elizabeth East SA 5112
or
edarmag@chariot.net.au
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Australia
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## Our Cover this month

In December 1997, an 80 metre receiver for ARDF Radio Sport was published by Ian Stirling VK3MZ. This unit, based on the now superseded MC3362 receiver chip, was very popular in Australia and also used overseas. An updated version of this receiver begins on page 4.

**Contributions to Amateur Radio**
Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the Federal Office on receipt of a stamped self-addressed envelope.

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Tel: (03) 9528 5962 Fax (03) 9523 8191
http://www.wia.org.au

**All mail to**
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# Editorial Comment

**Colwyn Low VK5UE**

Welcome to another edition of AR. Another Remembrance Day Contest completed and its reputation as "The Friendly Contest" continues. I appreciated being able to have a few words with VK7GN and VK2AYD without feeling I was holding them back or slowing my own climb to 61 contacts. I operated in several sessions and enjoyed the time spent. This year AR has devoted more space to the RD than usual and this month we publish the Opening Address and some other material relevant to the RD Contest. Last month I suggested we should consider extending the significance of the Contest and recognise all those who have served their country since 1935 or further back in history. I leave this to your net and club discussions. How about an OTU on the subject?

The Publications Committee has been considering Equipment Reviews and has decided that there is a place for reviews that are just the operators comments on how a particular piece of equipment worked, without any detailed laboratory measurements. Almost all modern rigs do meet their manufacturer's specifications. I have had one offer of a review of this type.

The Club Notes comment on the VK5 WICEN support of the Rally SA. Operations covered safety and scoring. Voice and Packet used the Amateur 2 m band. The SkyNet system using 70 cm LIPD frequencies was also operated by WICEN. This system used an airborne relay back to the Rally HQ to provide Start and Finish times and also had Safety on Stage points recording the cars automatically as they passed the Check Point receiving aerial. Each car carried an electronic tag. The only problem I was aware of was when the aircraft had to descend due to icing and some of the paths from valley floors became marginal. Triple redundancy paid off with me because my packet system did everything except be recognised by the HQ station. Everything I checked seemed to be set up correctly. It just reminded me that you can never assume every thing is correct until you have an actually test under operational conditions. After all the system was the same as last year in the Classic Adelaide Rally. So !!!!!!!!!

Discussions on the Entry Licence Australian licence continue. I hope that when all is over we get a revised licence system that encourages people, with an experimental urge, to enter Amateur Radio because it is a challenge they wish to take up. Let us hope the licence structure encourages them to learn as they operate and that those of us who meet them on this journey show the true Amateur spirit and help them develop their skills.

There will be no DX Column in this issue due to unforeseen circumstance.

Well keep up the operating and spreading the word. JOTA in October is the next big chance to influence possible recruits. The GASS did a good job in that area. Are we exploiting all possible events?

**73 Colwyn VK5UE**

## Amateur Radio in the Solomons and Somalia East Africa

Sam Voron VK2BVS, H44A, 6O0A has devoted considerable time and effort to improving radio communications throughout the Solomon Islands and Somalia. He works as a volunteer telecommunications technician. Particular attention has been made in both countries to promoting Amateur Radio. Amateur radio is accepted in both countries as a community resource. Sam has been instrumental in establishing Amateur Radio Schools. The work has involved developing courses for licences and Amateur support for relief operations. Both countries are looking for donations of amateur equipment to assist with this work.

For further information about Somalia contact Sam at svoron@hotmail.com and or visit www.radiogalkayo.com

For donations of equipment to the Solomon Islands contact the Director of the Solomon Islands National Disaster Council, NDC, Mr Loti Yates who can organise duty free all items being donated. His E-mail is-lotiyates@yahoo.com

# WIA Comment

**Ernie Hocking VK1LK**
Email: president@wia.org.au
Or via PO Box 691 Dickson ACT 2602

Things have remained surprisingly busy for the Federal WIA over the last month. The activity has centred around a number of areas including:

- Finalising the administrative arrangements with the ACA for the WIA management of examinations
- Lobbying the ACA in respect of the removal of the Morse requirements from the Australian Licence Conditions.
- Preparation for the ACA amateur radio discussion paper, and
- The lead up to WRC 2007, and the ever present need to recruit more volunteers to help administer the hobby.

## More on the Post WRC Morse removal

The WIA application to the ACA seeking the early removal of the testing requirements for Morse code from Australian licences for access below 30 MHz has to date not been successful. The ACA have informed us that they feel unable to make the required changes without consulting the amateur radio community. As such they have proposed to conduct the proposed Review of the Amateur Radio Service and based on the responses to try and implement any required change as soon as practical after that, but still before the full range of changes to the Amateur Radio Service that are scheduled for 2005. The WIA has not given up on this matter and will continue to liaise with the ACA to seek the earliest possible adoption in line with WIA member's views.

## The ACA Discussion paper on the Reform of the Amateur Radio Service in Australia

The discussion paper has been now been issued. For those with access to the web the paper can be downloaded from the ACA web site. Jim Linton VK3PC has summarised the paper and made this summary available on the Victoria web site and also recorded the summary on QNEWs. I hope that you will be able to access either the original or the summary in order to form your own opinion on the proposals. The ACA have given us some 2 months to formulate our responses (these are due by 31 October 2003).

Because of the 2 month time frame it is important that you obtain the discussion paper as soon as possible and provide comments to your clubs and divisions for inclusion in the Federal WIA response. It is extremely important to the future of amateur radio in Australia that the WIA response to the ACA discussion paper accurately reflects both current opinion as well as the future needs of the hobby. We will not get a second chance to have such a wide ranging impact on the legislative framework of our hobby and I for one want to be able to be part of a active and thriving amateur radio community that will celebrate 100 years of the WIA in 2010.

## Call for volunteers

The time has come once again to make a call for volunteers to help in the running of the Federal part of the WIA. I know that a number of you are actively involved in the administration of the local clubs as well as the State and Territory based Divisions. There are though a number of additional positions that we need to fill nationally. These include, the position of AR Editor, The Federal Contest Manager, The Federal Historian as well as a number of others. You might well ask what sort of skills and experience you need to fill these positions. For most of them you will need basic IT skills along with ready access to the Internet. The ability to organise and get things moving is also useful. Apart from that the main requirement is enthusiasm. I'd even go as far as to say that some of the positions that we have open don't even require that you are a licensed amateur radio operator (for example that of the Federal Historian). If you are interested, or know a non amateur who is looking for a challenge then please make contact with me and we can talk about these opportunities.

## Looking forward to WRC 2007

WRC 2007! Yes it does seem like a long way off. However for some of us work has already started. The draft agenda has already been published and the whole radio community in Australia has started the task of analysing the agenda items to determine what the technical impact of the item would be on the Australian use of the radiofrequency spectrum. If you are interested in becoming involved in the preparatory meetings for the next WRC then I'd love to hear from you. If you believe that you have the necessary technical skills then this can be a chance to meet with some of the leading experts across Australia and work with them to establish the Australian position for the next round of ITU/WRC.

## The IARU Region 3 Conference

Your will remember that the IARU Region 3 Conference this year was postponed due to the SARS outbreak. Although we do not yet have a final date it does look like the conference will now take place in February 2004. These IARU conferences are an important part of establishing common positions in respect of amateur radio across the Asia Pacific region. This year, as always, we are looking for papers on matters of interest to amateur radio that we should submit. The sort of subject material can be very diverse as long it relates to amateur radio. This year papers related to Public Protection issue such as the WICEN involvement in Australian bushfires earlier this year would be of relevance. Others, on topics of a more technical nature, such as for example IRLP or other Internet linking activities along with papers on the educational aspects of amateur radio would be welcome. So if you have a burning issue, that you think others would like to hear about in the wider amateur radio community, then break out your keyboard and start typing. In the first instance you can send submissions directly to me or via your local Division.

Anyway I'd better bring this to a close since I am already late for the deadline for submissions (so if AR turns up late this month you should blame me). 73s to you all and I look forward to hearing you comments, either directly or via the divisions. All the best in amateur radio

# An 80 metre Receiver for ARDF Radio Sport

**In December 1997, *An 80 metre receiver for ARDF Radio Sport* was published by Ian Stirling VK3MZ. This unit, based on the now superseded MC3362 receiver chip, was very popular in Australia and also used overseas. An updated version of this receiver is presented here.**

## What is ARDF?

ARDF is a pedestrian style of fox or transmitter hunting which requires the competitor to find, depending on age class, up to 5 hidden transmitters in a bush or parkland area. It is bound by a set of international rules of the IARU and it is not uncommon to see up to 30 countries represented at a world championships. Australia will be hosting the next Region 3 championships starting on 28 November 2003 and we will be looking for competitors to fill each age class.

A standard orienteering map is used with only the start and finish locations marked. The competitor is required to determine the position of each transmitter, navigate to each one and then back to the finish in the shortest possible time. Each transmitter transmits in turn on the same frequency with morse code identification (MOE, MOI, MOS, MOH and MO5) for 1 minute out of five and then switches off for four minutes until its turn comes around again. Courses depending on age class are typically between 4 and 10km and there is normally a homing beacon at the finish on a different frequency.

Another form of radio sport popular in some European countries is called fox-oring. Ten or more circles of typically 100 metre radius are drawn on an orienteering map. Located somewhere in each circle is a rapidly pulsed very low power transmitter

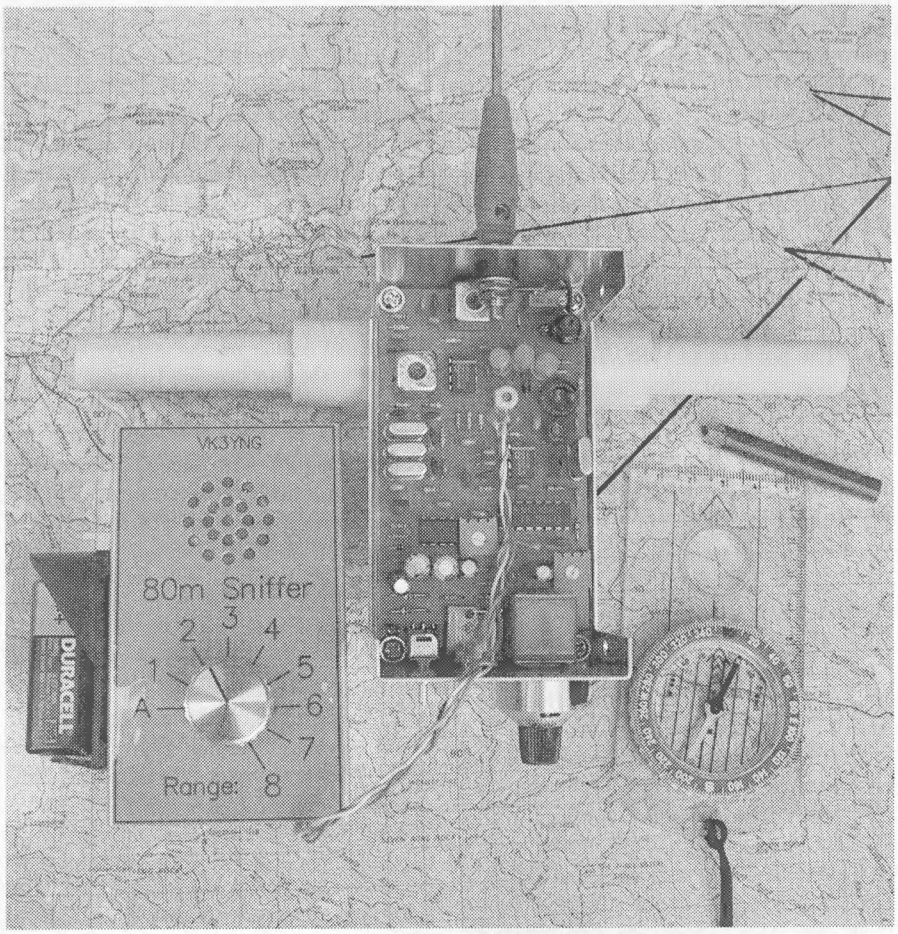



Figure 1: the 80m sniffer

usually marked with an orienteering control. The transmitter should only be able to be heard within the circle. The idea is to visit as many controls as possible and get back to the finish within a specified time limit. In orienteering terms this is known as a "score" course.

## A Redesigned Receiver

Since the discontinuation of the MC3362 used in the original VK3MZ design, a more discrete design based on the more available Philips SA612 is presented here. Whilst this part has some shortcomings compared to the original Motorola part, performance has actually increased in some areas, particularly sensitivity.

There were several key requirements to this new design:

1) To duplicate the functionality of the original VK3MZ design.
2) To reduce overall size and weight.
3) The home constructor should be able to build the project using basic tools

The first objective is of primary importance. The original design has proved itself through several years of field use. It provided a good compromise between cost and complexity. It has enough performance to make it suitable for serious competition use while keeping the cost and operational complexity low enough to make it suitable for the beginner.

The second objective has been achieved through eliminating a number of larger parts from the original design and the use of 1/8 watt or vertically

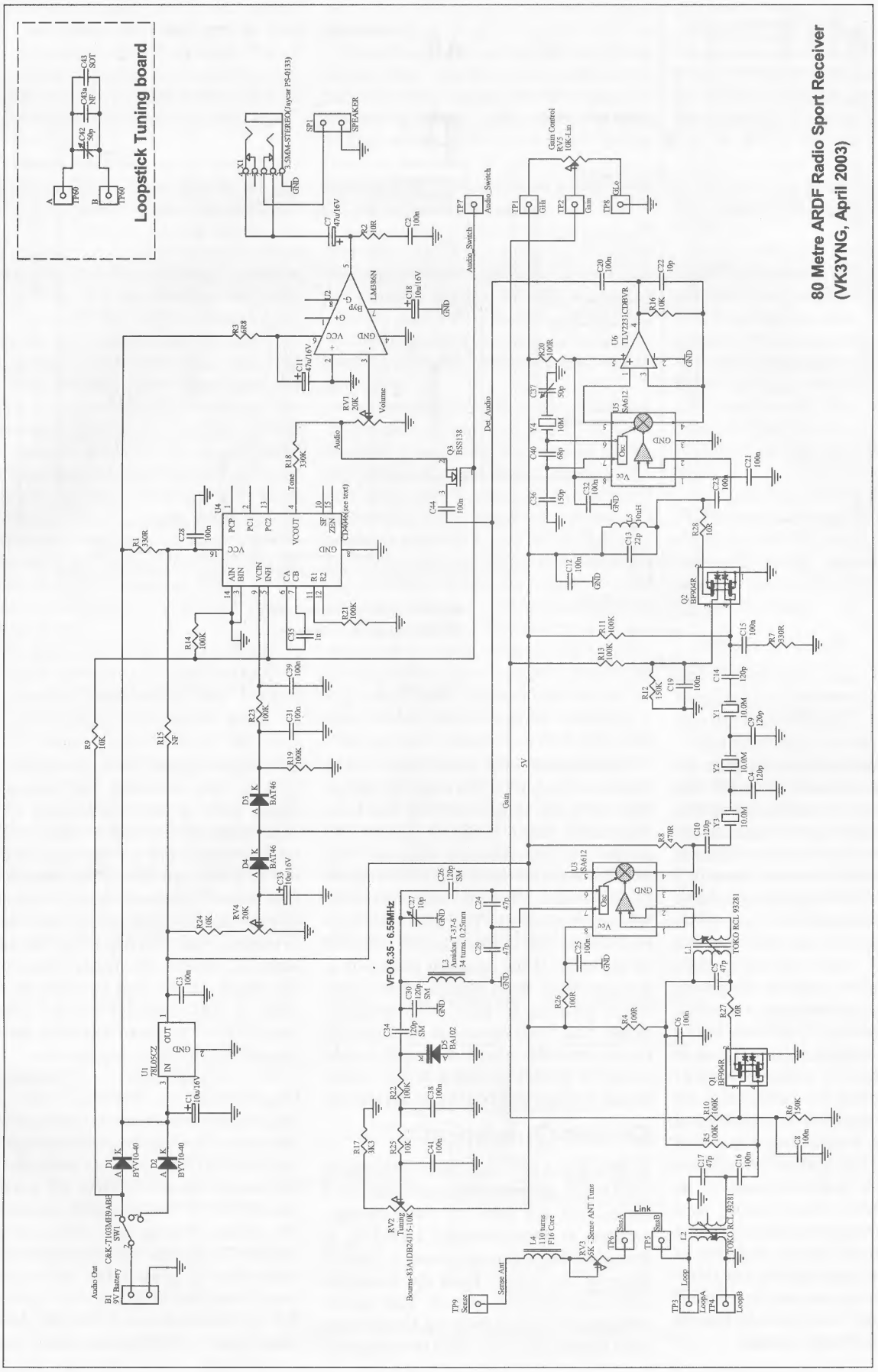

80 Metre ARDF Radio Sport Receiver
(VK3YNG, April 2003)
Loopstick Tuning board
VFO 6.35 - 6.55MHz
Audio Out
Sense Ant
Loop
Link
Gain Control
Audio_Switch
Det_Audio
Volume
Tone
Gain
5V

Figure 2

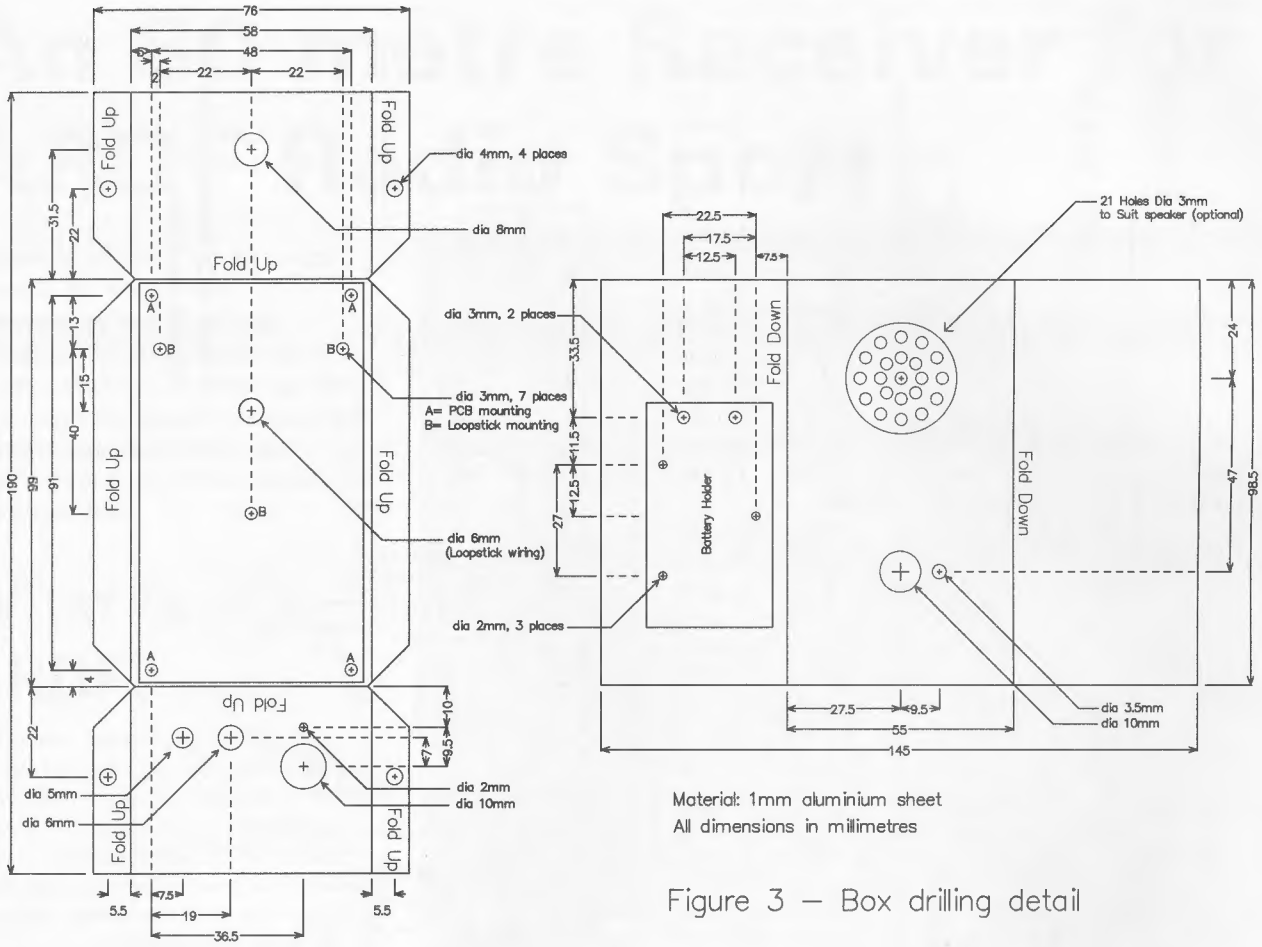



Figure 3 – Box drilling detail

mounted 1/4 watt resistors. (A good kit containing lots of these 1/8 watt size parts is available from Jaycar: Cat RR-2000) This was done partly because the original size case had become difficult to source, and also because there is a preference for ARDF equipment to be as small and light as possible.

The third objective dictated that the design should use through hole components where possible. However, as is becoming increasingly common, many newer components are being offered only in surface mount. There is a small number of surface mount components used in this project that are not available as a leaded variant. A good pair of tweezers, a soldering iron with a relatively small tip, a steady hand and an adjustment of mindset (some of us have successfully been using this technology as hobbyists for more than a decade now) are all that is required to work with these components. For those who still claim to possess surface mount phobia the author can provide boards with these parts already loaded.

There have also been some other improvements over the original design. One of these is that wiring has been simplified since both the power and mode switch, tuning control and earphone socket mount directly on the circuit board. This minimises external wiring immensely. The sense antenna switch has also been removed, but may be included if the operator prefers it. It has generally been found, particularly when hunting in tone or "whoopee" mode, that once the sense antenna has been correctly adjusted, there should rarely be a need to switch it out. It also makes for one less control to get wrong!

## Circuit Operation

A ferrite rod or "loopstick" antenna is used as the main receiving element. Two capacitors are used to resonate this antenna at approximately 3.55MHz. A few coupling turns are used to couple some of the energy from the loopstick into the receiver input. The sense antenna is used to pick up the electric field signal and mix it with the magnetic field signal picked up by the ferrite rod coil. In one direction this causes the signal level to increase slightly as the signals effectively add in phase. In the opposite direction the two signals arrive out of phase and effectively cancel. For this to work the sense antenna needs to be resonant. L4 adds enough inductance to achieve this. The level from the sense antenna, which effectively determines the depth of the null is controlled by RV3. A link from RV3 to L2 allows insertion of a sense antenna switch should the operator require one.

L2 provides impedance transformation between the low impedance presented by the antenna network to the high impedance required by the MOSFET input. C17 resonates the coil secondary at 3.55MHz. Q1 is a dual gate MOSFET that is a little unusual in its design. It is in fact two dual gate MOSFETS in one. The arrangement is supposed to give a lot better cross modulation handling under gain control. For more information on this device, download the Philips datasheet. R5, R6

and R10 form biasing for Q2. R27 damps any possible oscillation in the microwave region. L1 forms the RF amp output tank resonated at 3.55MHz by C5. The output of L1 couples directly into the first mixer U3 as a differential signal on pins 1 and 2.

Tuning is accomplished by varying the voltage on RV2. Since this is an up-conversion receiver, the local oscillator frequency needs to decrease for increasing received frequency. This translates to the tuning voltage decreasing for increasing receiver frequency. R17 limits the voltage swing available and ensures the varactor does not get too close to zero volts. C41, C38 and R25 provide some filtering of the tuning voltage while R22 provides a high impedance path to couple this voltage into varactor diode D5. C34 provides DC blocking and L3 forms the main resonant element. The core MUST be made of Iron powder. Ferrite, apart from being temperature sensitive, is also susceptible to the earth's magnetic field and caused shifts of several hundred hertz as the receiver was rotated. If you don't believe this – try it!

C30 places a limit on the varactor tuning range while C26 couples the VFO into the oscillator input. C30, C34 and C26 should all be silver mica or polystyrene types as they are very sensitive to self heating and temperature drift. DO NOT use NPO ceramics for these parts. Polystyrene has a slight negative temperature coefficient which helps to cancel out the positive temperature coefficient of the varactor and inductor. C29 and C24 provide oscillator feedback ensuring that the input resistance looks negative. C27 provides adjustment for band edge tolerances.

The output of the mixer feeds a crystal ladder filter. This filter uses inexpensive microprocessor grade crystals to provide a lower sideband filter approximately 2kHz wide. R8 provides input termination and R7 provides output termination. C15 serves as a DC block for the termination.

The ladder filter is fed into an IF amplifier Q2. This is a similar circuit to that of the front end amp. L5 and C13 resonate the drain at 10MHz while R28 ensures stability. There is more than 80dB of gain control range available split between the RF amplifier and the IF amplifier.

The output of the IF amp is provided to second mixer U5 pin 2. A beat frequency oscillator is provided by Y4 and feedback capacitors C36 and C40. C37 provides tuning of the crystal frequency. The output of the second mixer is amplified by CMOS Op-Amp U6. C22 ensures stability and filters out any 10MHz. R16 sets the amplifiers gain. The output audio is DC blocked by C20.

Gain controlled Detector audios are supplied to diode detector D3 and D4. RV4 provides a bias voltage to the diodes to provide some forward bias current so that weaker signals can be detected. A filter network comprising R19, C31, R23 and C39 filter out the remaining audio component to provide a DC voltage which is linearly dependant on signal strength. This signal is provided to pin 9 of U4 which is configured as an audio frequency VCO. C35 and R21 control the oscillator centre frequency. R1 provides a filtered supply to U4. R15 can be substituted if a regulated supply is preferred.

The output of the Audio VCO is attenuated by R18 and provided to a preset volume control RV1. Audio is amplified to a level suitable for driving headphones or a small speaker by U2. R10 and C20 decouple the amplifier from the supply. R2 and C2 provide an idler load for stability of the audio amplifier. C7 provides output DC blocking.

SW1 doubles as a power switch and Tone/Audio mode control. In the Audio position the supply is provided to U4 pin 5 and Q3 via R9. This inhibits the output of the tone VCO and supplies detected audio directly to RV1. Hence Q3 is used as a MOSFET audio switch. C44 provides DC blocking for the audio path. In the Tone position R14 ensures that pin 5 of U4 and Q3's gate are at zero volts.

D1 and D2 provide reverse polarity protection for the battery. U1 provides a regulated 5 volt supply to most of the receiver circuits. Typically the receiver drains around 35mA depending on volume setting.

## Construction

Before beginning any construction or handling any active components ensure you are well earthed.

The first components to be mounted are surface mount parts Q1, Q2, L5 and U6. These devices are mounted on the underside of the PCB. Q1 and Q2 have four pins, one of which is slightly wider than the rest. Tin the wider pad on the PCB with a small tipped soldering iron and a small amount of solder. Hold the component in place with a good pair of

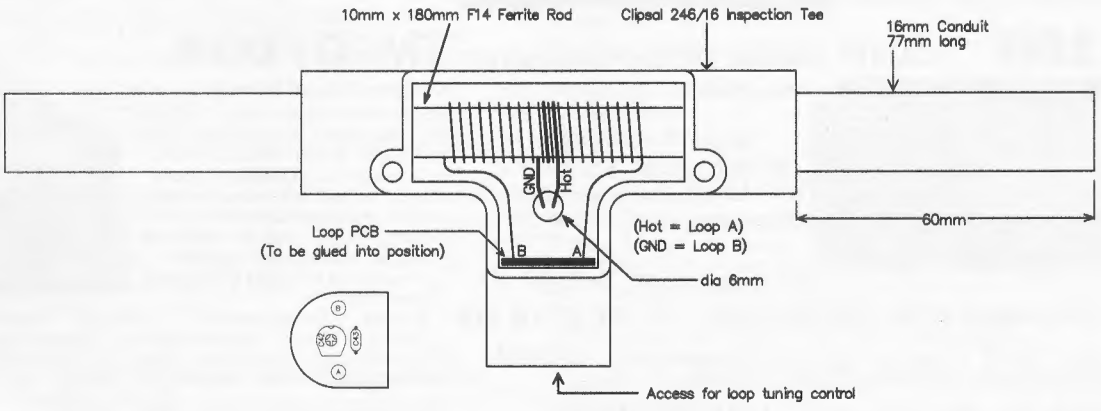



Figure 4 – Loopstick Assembly

# G. & C. COMMUNICATIONS

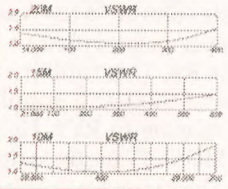
Authorised dealer for ● Kenwood ● Icom ● Barrett RFDS ● GME Electrophone ● Uniden ● YAESU

## TE-33 3 element tri-band yagi antenna

**The most popular tri-bander!**

**Storm proven in Pacific islands.**

**Excellent performance.**




Wide bandwidth, high gain, low SWR, high F/B ratio. Marine grade S/S h/ware. 6063T83 aluminium tube and specially machined heavy duty aluminium brackets.

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## TH-F7E Kenwood

### Amateur VHF/UHF Transceiver

**Freq:** TX: 144-146 /430-440 MHz
RX: 0.1-1300 MHz
**Mode:** TX: FM RX: AM/FM/SSB/CW
**RF Power output:** Hi: 5/5 W Lo: 0.5/0.5 W El: 50/50 mW
**Voltage:** Internal: 5-7.5 VDC External: 12-16
**Weight:** 250 gr (with lithium-ion battery pack)

## IC-208 Icom

### IC-208 Amateur VHF/ UHF Transceiver

**Freq:** TX: 144-146 / 430-440 MHz RX: 118-1000 MHz
**Mode:** TX: FM RX: AM/FM
**RF Power output:** Hi: 50 / 50 W, Mid: 15 / 15 W, Low: 5 / 5 W
**Voltage:** 13.8 VDC **Weight:** 1.2 Kg

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**Freq:** 144-148 / 430-440 MHz 1240-1300MHz
**Mode:** FM/FM-N/SSB/CW
**RF Power output:** 5-100 / 5-75 W
**Volt:** 13.8 VDC **Imp:** 50 ohms, SO-239 / N
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place with the soldering iron. Solder the other three pins and then resolder the wider pin. L5 is not polarity sensitive and U6 orientation should be obvious. Solder these parts using a similar technique.

Next mount all the through hole passive components. All fixed resistors have a 6mm lead spacing. If 1/4 watt resistors are used, these can be mounted on end or parallel to the board with the leads bent slightly inwards. It is highly recommended to use the 1/8W package style if possible. Most capacitors have 5mm lead spacing. Take note of the polarity on the electrolytic capacitors. Solder the crystals and inductors L1 and L2 in next. L3 and L4 are to be placed later. Don't forget the wire link between the TP5 and TP6 pads.

Solder the diodes, transistors and integrated circuits. For U4, a CD4046 is specified. A 74HC4046 can be used, but with some types the setting of RV4 can be considerably touchy and the values of R21 and C35 may need adjustment. The upside of this device is that it can be effectively run from a regulated supply. Use R15 if the 74HC4046 is used instead of R1. Never fit both R1 and R15 at the same time. This can be done with the standard CD4046 but the audio pitch range will suffer.

Power switch SW1, headphone socket X1 and tuning control RV2 should be mounted next. Make sure they are sitting parallel to the board before soldering them into place. If you are using 2-pin headers for SP1 and B1, solder them in now.

For L3, wind 32 turns of 0.25mm enamelled copper wire onto an Amidon T-37-6 core. The turns need to be evenly distributed around the core. Start and finish positions and winding direction are not important. Tin the ends and solder the coil into place. Fasten the core in place with a 3mm nylon screw and nut.

For L4, wind 110 turns of 0.25mm enamelled copper wire in a multi layer format on a 5mm former. Keep the turns to the bottom 10mm of the former. Tin the leads and solder them onto the two posts on the coil former. Screw an F16 ferrite core half way into the former and solder the core into place.

Drill out the box as per the detail shown in figure 3.

Wire up the gain control, battery and

## Parts List

### Resistors:

R1, R7 – 330R 1/8W Resistor (2)
R2 - 10R 1/8W Resistor (1)
R3 - 6R8 1/8W Resistor (1)
R4, R20, R26 – 100R 1/8W Resistor (3)
R5, R10, R11, R13, R14, R19, R21, R22, R23 – 100K 1/8W Resistor (9)
R6, R12 – 150K 1/8W Resistor (2)
R8 – 470R 1/8W Resistor (1)
R9, R16, R24, R25 – 10K 1/8W Resistor (4)
R15 – not normally fitted (see text)
R17 – 3K3 1/8W Resistor (1)
R18 – 330K 1/8W Resistor (1)
R27, R28 – 10R surface mount 0805 resistor. (2)
RV1, RV4 – 20K PCB Mount Horizontal Trimpot (2)
RV2 - Bourns-83A1DB24J15-10K PCB mount 10-turn rotary potentiometer
(with model 16 multidial for better tuning accuracy) (1)
RV3 - BOURNS-3296 5K linear PCB multiturn Vertical Trimpot (1)
RV5 – 10K Linear panel mount potentiometer (1)

### Capacitors:

C1, C18, C33 - 10u/16V Polarised RB Electrolytic capacitor, 5x11mm (3)
C2, C3, C6, C8, C12, C15, C16, C19, C20, C21, C23, C25, C28, C31, C32, C38, C39, C41, C44 -100n, 25V X7R Monolithic capacitor (19)
C4, C9, C10, C14 – 120p NPO ceramic capacitor (4)
C5, C17, C24, C29 – 47p NPO ceramic capacitor (4)
C7, C11 - 47u/16V Polarised RB Electrolytic capacitor, 5x11mm (2)
C13 – 22p NPO ceramic capacitor (1)
C22 - 10p NPO ceramic capacitor (1)
C26, C30, C34 – 120p Polyester or Silver Mica ** do not substitute ceramic** (3)
C27 –Variable Capacitor Murata 2-10p (white) (1)
C35 – 1n, 50V X7R Monolithic or ceramic capacitor (1)
C36 - 150p NPO ceramic capacitor (1)
C37, C42 – Variable Capacitor Murata 9.8-50p (brown) (2)
C40 – 68p NPO ceramic capacitor (1)
C43 – 33p NPO ceramic capacitor (1)

### Crystals/Inductors:

Y1, Y2, Y3, Y4 – 10MHz, HC49/4H microprocessor crystal, parallel resonant 16pf load (4)
L1, L2 - Toko RCL 93281 coils (available from author) (2)
L3 – 32 turns 0.25mm enamelled copper wire on Amidon T-37-6 (yellow) core (from Truscott Electronics, Bayswater) (1)
L4 - 110 turns 0.25mm enamelled copper wire on 2 pin 16mm vertical former (available from author) with 4mm F16 tuning slug (DSE R-5025) (1)
L5 – 10µH surface mount inductor. Coilcraft 1008LS-103XJ or equiv. (1)
Semiconductors:
D1, D2 – BYV10-40, 1A Axial Shottky Power Diode (2)
D5 - BA102, Varactor Diode (1)
D3, D4 – BAT46 Shottky diode or OA95 Germanium diode (2)
Q1, Q2 - BF904R, Philips N-Channel Dual Gate Mosfet (2)
Q3 - BSS138 SOT-23 surface mount low voltage N-channel MOSFET (1)
U1 - 78L05CZ, 3-terminal 100mA TO92 Regulator (1)
U2 - LM386N, 8-pin DIP Audio Power Amplifier (1)
U3, U5 – Philips SA612N Mixer/Amplifier (1)
U4 – CD4046N, CMOS low power VCO/PLL (1)
U6 - TLV2231CDBVR Rail to rail, Low power surface mount Op-Amp (1)
Mechanical/Misc:
SW1 - C&K T103MH9ABE, SPST centre off toggle switch-R/A PCB mounting (1)
X1 – Stereo 3.5mm PCB mounting socket, Jaycar PS-0133 or equiv. (1)
SP1 – 8 ohm 27mm speaker (optional) (1)
Quick release 9V battery holder (Jaycar PH-9235) (1)
4mm plug, Jaycar PP-0391 or equiv. (1)
4mm socket. Jaycar PS-0408 or equiv. (1)
F14, 200 x 10mm Ferrite Rod antenna (Truscott Electronics, Bayswater) (1)
Aluminium case, 100 x 60 x 45mm (DSE H-2305) or 1mm aluminium sheet (1)
Single sided PCB (available from Author)
Knobs (2)
16mm Inspection tee - Clipsal 246/16 (1)
16mm Conduit, 67mm long (2)
8mm M3 threaded standoffs (4)
M3x5 screws (8)
3mm nylon screw and nut (1)
15mm heatshrink tubing
9V 216 type alkaline Battery (1)
For more information:
The Victorian ARDF group web page: http://www.ardf.org.au
Joe Moell's (USA) foxhunting web page: http://www.homingin.com
The Author's web page: http://www.users.bigpond.net.au/vk3yng/foxhunt
The Author's email address: backerly@bigpond.net.au

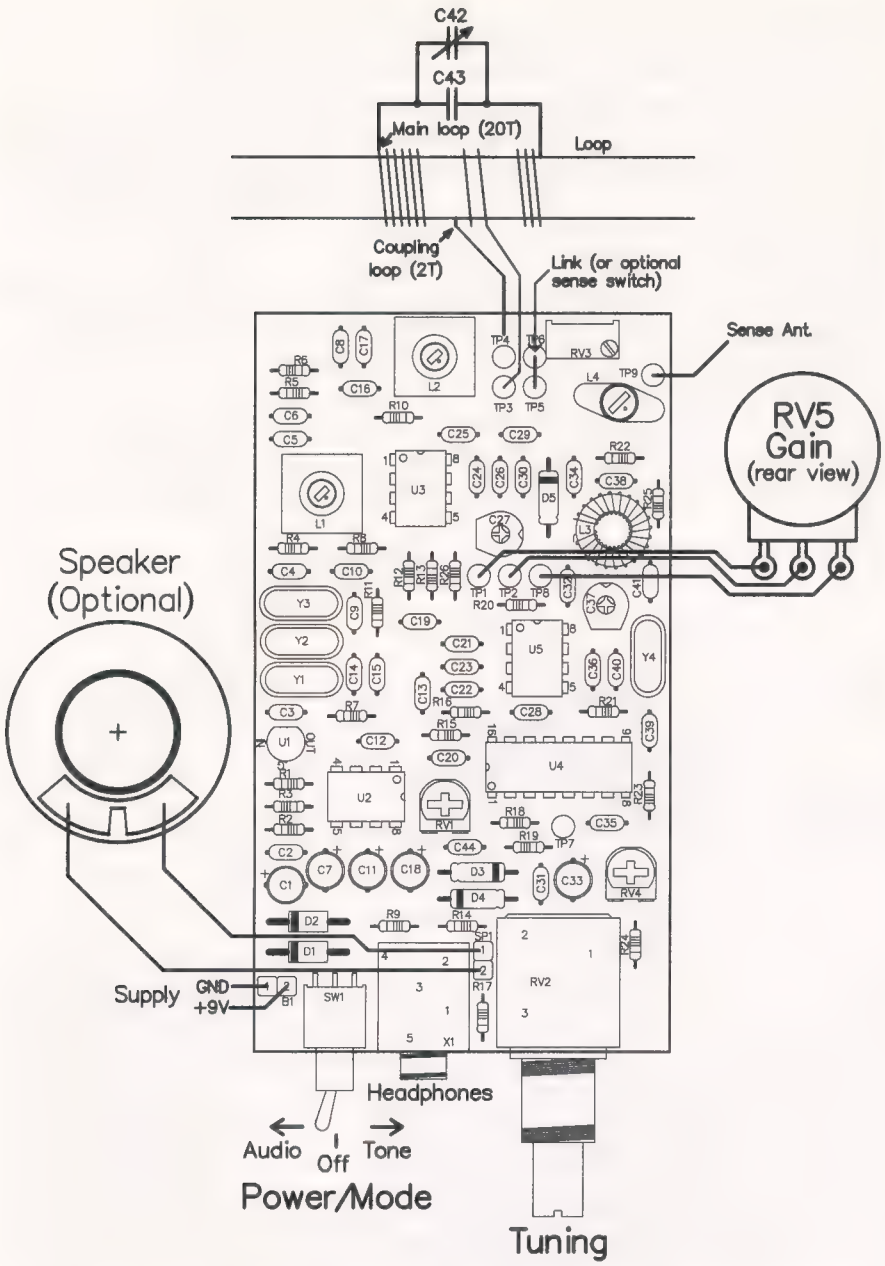


Figure 5 – Board loading and external connections

speaker connections to the PCB using flexible hookup wire.

Note that for ARDF Radio Sport use it is a requirement that the receiver does not emit sound. Headphones are therefore compulsory. It is also common practice to mount a compass to the receiver. The constructor may therefore wish to omit the speaker altogether if the receiver is intended only for ARDF competition use. Also, the Ferrite Rod distorts the earth's magnetic field, so if a compass is used it should not be mounted close to the Ferrite Rod.

Cover the mid section of the ferrite rod with a 60mm long section of 15mm heatshrink tubing and shrink to fit. Wind 20 turns of 0.5mm enamelled copper wire over the mid section of the ferrite rod with tails 40mm long. Wind two coupling turns of 0.5mm enamelled copper wire over the mid section of the ferrite rod with tails 80mm long. Strip and tin the ends. Mount the rod inside PVC electrical conduit as shown in figure 4. Note that the recommended ferrite rod is obtained from Truscott Electronics World. Cheaper equivalents are available from Jaycar and DSE, but have been found to contribute more than 7dB of additional loss due to Q reduction which limits receiver sensitivity.

Mount the PCB into the box using 6mm long M3 spacers. Mount the sense antenna socket and controls and wire up as shown in figure 5.

A sense antenna is needed. This can be made of brass rod or even coat hanger wire. A 450mm length of wire is needed and this should be soldered into a 4mm plug. Cover the top end of the antenna with a dozen or so layers of electrical tape to reduce possibility of eye damage with the end of the antenna.

## Alignment

Alignment requires a low level signal source and an attenuator or an RF signal generator. If you don't have a signal generator, a special board that can be used as a 3.58MHz alignment source is included in the board set. It is recommended that you build it first. This board also doubles as a fox-or mini-transmitter!

Set RV1 to mid position. Provide power to the receiver, switch the power switch to "Audio" and set the gain to maximum. Depending on how close the initial tuning is, a small amount of "hiss" should be heard in the speaker.

Adjust C37 (BFO adjustment) for a peak in the noise level in the speaker. At this stage there is no need to be precise with this adjustment.

Connect the signal generator to the receiver input (use the loop terminals) and set the input level to about –80dBm at 3.58MHz. Adjust the tuning until a tone is heard in the speaker. If the tone is too loud, reduce the signal level into the receiver or turn down the receiver gain slightly. Adjust L2 for maximum level. Reduce the gain and adjust L1 for maximum level. Set the signal generator to –120dBm and ensure the signal can still be heard when the gain control is set to maximum.

Set the signal level to –80dBm and reduce the gain to a comfortable level. Tune past the signal with the tuning control and check that the tone has an even spread and is not too "peaky". If it is, adjust C37 to try to even the response out. Be careful not to set it so that the overall audio level drops or so that the receiver responds to part of the wrong sideband. The receiver should only respond to one side of zero beat and the received tone should increase as the tuning control is increased.

Remove the signal source and set the mode switch to "Tone". Adjust RV4 until a slow "ticking" is heard in the speaker (approximately 1-10Hz). Adjust RV1 (volume) to a comfortable level. Apply a signal to the input of about –80dBm. The tone should change to a high pitch. You may need to switch back to "audio" temporarily to ensure the receiver is still correctly tuned. Reduce the gain so that the pitch is at a "mid way" level. Carefully adjust L2 and L1 for the highest pitch.

Set the signal source to 3.5MHz. Wind the tuning control down to ensure the tuning will cover this frequency. Adjust C27 so that there is a few kHz of overlap below 3.5MHz. Set the signal source to 3.6MHz. Wind the tuning control up to ensure the tuning will also cover this frequency. The tuning is designed to cover around 200kHz so there should be plenty of overlap on each end. If the range is not covered, it may be necessary to add or remove a turn off L3. Remove a turn if 3.5MHz is not covered, and add a turn if 3.6MHz is not covered.

Connect the ferrite rod antenna to the receiver input. Set up a signal around 3.58MHz, into an antenna nearby. Tune the receiver to the signal frequency and adjust C42 for maximum signal level.

The next step is to verify loop tuning and align the sense antenna. This should be done during the day to avoid skywave effects.

Set up a continuous vertically polarised transmitter on about 3.58MHz in an open field. Set up the receiver at least 250m away in an area free of reflecting objects with a clear view of the transmitter location. Orient the receiver so that the ferrite rod is at right angles to the direction of the transmitter. Tune the receiver to the transmitter's frequency in "audio" mode then set the mode to "tone" and adjust C42 for the highest received level. Do not readjust L1 or L2.

Attach the sense antenna. Orient the receiver so that it faces exactly 180 degrees from the transmitter. (i.e. away from the signal source.) Set RV3 for maximum resistance. Tune L4 and then RV3 for minimum signal level. There may be some interaction between the two adjustments which may require both RV3 and L4 to be readjusted. The sensitivity will also need to be increased to ensure the greatest null is achieved. Once the sense antenna has been aligned, face the receiver towards the transmitter to ensure there is a large difference between the forward and reverse directions.

Assemble the case cover and make sure that the reverse direction null is still deep. Take care to keep any wiring away from the VCO components (L3 and associated capacitors and pins 1 and 2 of U3)

## Operation

Operation of the receiver is fairly simple. In most cases, the receiver will be tuned to a known frequency between 3.5 and 3.6MHz using the audio mode with the sensitivity set to maximum. It is possible to tune to the wrong sideband with much reduced sensitivity. The audible pitch of the received signal should increase as the tuning frequency is increased. If this is not the case, keep tuning in the upward direction past the signal currently being heard. Be careful as the signal level of the proper sideband will be many times greater in level and may be much higher than you may expect. Be ready to turn down the gain!

Once the signal is tuned to a received pitch of between about 400 and 1000Hz, change the mode to "tone" and adjust the attenuation so that the direction of the signal can easily be determined. The direction of the transmitter is indicated by maximum audio pitch. For very weak signals, the Audio mode may need to be used until there is enough signal to allow the signal to be received in tone mode.

As you move closer to the transmitter, the maximum pitch will increase. Increase the attenuation to avoid the receiver saturating so that the direction can be determined. There should be enough attenuation to allow you to get within a metre of a conventional vertically polarised 2 watt transmitter. You may even wish to put calibration marks for say 50, 100 and 200 metres away from the transmitter. This can be useful to allow you to gauge whether it is possible to get to a transmitter within its one minute cycle. In international ARDF competitions there is usually a typical transmitter set up on the training day before the competition for this purpose.

With a little practice, the operation of the receiver will become second nature. It is also useful to make sure that there is no easy way to "bump" the receiver tuning control while navigating through the bush.

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**It is difficult to imagine an instrument with greater versatility than the cathode-ray oscilloscope. A CRO gives us the ability to observe and quantify electrical events, or indeed any other phenomenon, which can be converted (or transduced) into an electrical signal.**

Considering that radio amateurs are the masters of appliances, which are the very quintessence of electrical signal generators and processors, it is perhaps surprising that the oscilloscope (CRO or 'scope from hereon) is regarded by some of our fraternity to be an unnecessarily complex instrument for the efficient conduct of radio work. Yet in the hands of a competent user, the CRO is an extremely powerful tool. Reasonably priced second-hand BWD, HP and Tektronix 'scopes often show up at hamfest sales. 20 MHz service type 'scopes may be purchased new for about $400, and 50 MHz models for about $900.

Very basically, a CRO works like this; a focused electron beam is projected down the length of an evacuated cathode-ray tube onto a light emitting phosphor, which is coated upon the inside of the tube's glass screen, hence causing a visible spot to appear at the point of impact. Electrostatic deflection plates within the tube permit the beam to be very rapidly positioned at any point upon the tube's screen viewing area. Signals applied to the Y, or vertical plates deflection plates deflect the beam vertically, and signals upon the X, or horizontal deflection plates deflect the beam horizontally. Thus we have a graphical X-Y display with an extremely fast response.

The most common application for radio and electronics work is where signals are applied to the vertical input (or inputs- most new instruments now have at least two vertical input channels) of the 'scope. The screen area is fitted with a graticule of intersecting lines forming a grid of squares perhaps X10 x Y8 'divisions'. The position of the spot upon the horizontal axis is usually under the control of the 'sweep' or 'time-base' circuitry, where the spot is made to trace a sweep from left to right of the display area at various known rates, or speeds. A popular range is from perhaps 1 second/division (1 s/div.) to about 0.1 ms/div. in a 1-2-5 sequence. A detailed description of the workings of 'scopes is not necessary for what follows. However, the curious are pointed to References 1 (ch 3), 2, 3 (p16.7), 4 (ch 26, 27) and 5. The essays listed under Further Reading are also recommended.

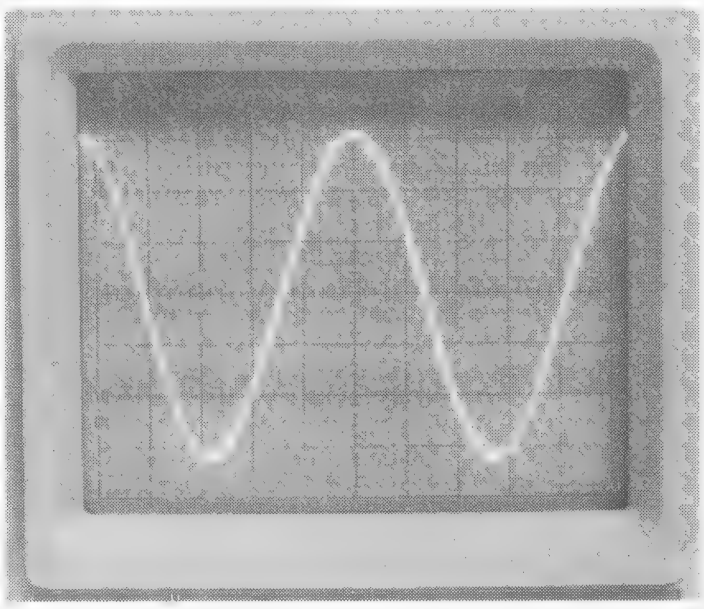

Photo 1. "Clean" sine wave

Conventional input impedance at the connector(s) where signals are applied is 1 MΩ shunted by (typically) 25 pF. This capacitance is the minimised, but unavoidable, parasitic capacitance of the input attenuator and vertical amplifier. The attenuator circuitry is cunningly arranged so that input capacitance is the same for every setting of the attenuator. Vertical sensitivity is determined by the position of the attenuator, which is calibrated in terms of volts or mV/div. usually in 1-2-5 sequence. For example, a signal is said to have a peak-to-peak (p-p) value of 6 V p-p if we observe that there are six divisions between the positive and negative crests of the wave when the attenuator is set for 1 V/div. as shown in Photo 1.

## Probe Measurements

A simple shielded cable with a prod and earth clip lead connected to the 1 MΩ input of the 'scope will, in most instances, cause too much loading upon the circuit under test. For general testing and fault-tracing applications, the more usual approach is to use a high impedance "x10" probe. An older style Tek x10 and a newer switchable x1/x10 probe are shown in Photo 2. A x10 probe divides the input signal by exactly 10 (so a 10 V p-p signal will display as 1 Vp-p), but the circuit loading will be greatly reduced to typically 10 MΩ shunted by 7 pF. To preserve accurate high-frequency response, it is important that the probe is correctly "compensated"; apply the probe tip to a square-wave signal (often provided as a 'cal.' signal output on the front panel) and adjust the comp. capacitor inside the probe housing for minimum displayed overshoot/undershoot.

A general rule for probe measurements is to use "x10" for signals containing high frequencies and all other instances where circuit loading must be kept to a

minimum. A typical example would be in examining the waveform across an oscillator coil. The simple shielded cable and prod (or select x1 on the probe) will find application in checking for noise and ripple on low impedance devices, such as power supplies. When only the ac component of a signal is of interest (most usual), select "ac" coupling for the input, and where the dc level of the signal is required, then select "dc" coupling.

## Signal Sampler

For transmitter tests, it is rather inconvenient to have to hook a probe onto our 50 ohm line (and the voltage there may exceed the probe's rating-usually about 300 Vrms). A better approach is to employ a signal sampler (actually a 40 dB attenuator) of the sort illustrated in Fig. 1 and Photo 3. Scraps of double-sided printed circuit board-soldered together, form the ends and two sides of a simple box. Main signal input and output connectors are the usual SO-239 (f), and the signal sample connector is a BNC (f). The sample signal is 40 dB below the main signal (or 1/100th the voltage). Being an attenuator in a 50 ohm system, the measurement is practically "flat", limited only by the vertical bandwidth of the 'scope. A 50 ohm terminating resistor (Fig. 2 and Photo 3) MUST be connected right at the INPUT of the CRO, as shown in Fig. 3, which shows the measuring set-up for the following transmission tests.

## Measuring Mean Power- CW

Use the set-up of Fig. 3. On CW mode, and into a suitably rated dummy load; key the transmitter on. Set sweep speed at or near the fastest speed (e.g. 0.1 ms/div.). Set trigger to "auto" and vary the (+) (-) trig control to acquire an on-screen steady (i.e. correctly "triggered") waveform.

When sampled as a -40 dB signal, a transmitter output voltage of (say) 200 Vp-p applied to the 50 load will be attenuated by a factor of 100, giving 2 Vp-p across the through termination at the 'scope input. The 'scope input attenuator should therefore be set to (say) 0.5 V/div. which in this example will provide a 4-division display.

A typical "barefoot" transceiver will deliver about 100 W on CW. At that

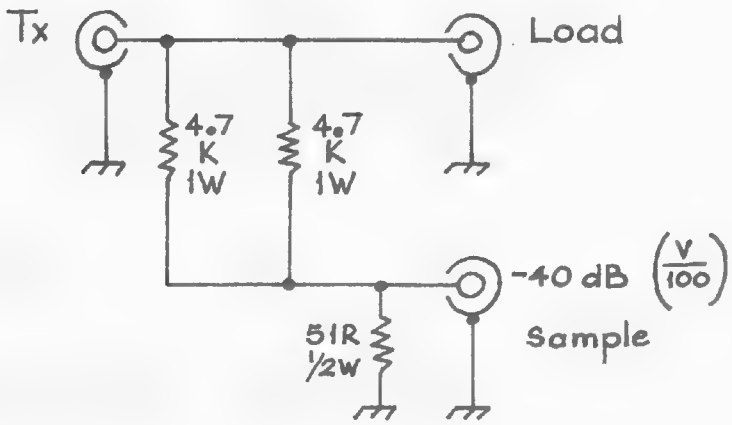


Fig. 1

power level in 50 ohms the RMS voltage will be

$V = \sqrt{P \times R}$ [Ref 3, p1.12]

Substituting:

$V = \sqrt{100 \times 50} = 70.7$ Vrms.

In 'scope measurements we observe the p-p voltage, which may be calculated;

Vp-p = Vrms x 2.818 [Ref 3, p1.12]

Substituting:

Vp-p = 70.7 x 2.818 = 199.23 Vp-p.

Conversely: $Vrms = \frac{Vp\text{-}p}{2.818}$

To calculate mean power:

$P = \frac{Vrms^2}{R}$ [Ref 3, p1.12].

or, when Vp-p in known:

$P = \frac{Vp\text{-}p^2}{R \times 7.94}$

[(R x 7.94) is usually 'rounded' to 8R- see PEP below].

*Example:* 1 Vp-p obtained, which is really 100 x 1 = 100 Vp-p at the load.

Substituting: $P = \frac{100^2}{8 \times 50} = 25$ W

## Measuring PEP and Checking Linearity

According to Ref. 3, p16.35; peak envelope power (PEP) is "the average power supplied to the load by a transmitter during one radio-frequency cycle at the crest of the modulation envelope taken under normal operating conditions"- which is probably as good a definition as will be found anywhere, and an 'scope is the ideal tool for the job.

The set-up of Fig. 3 applies. Photo 4

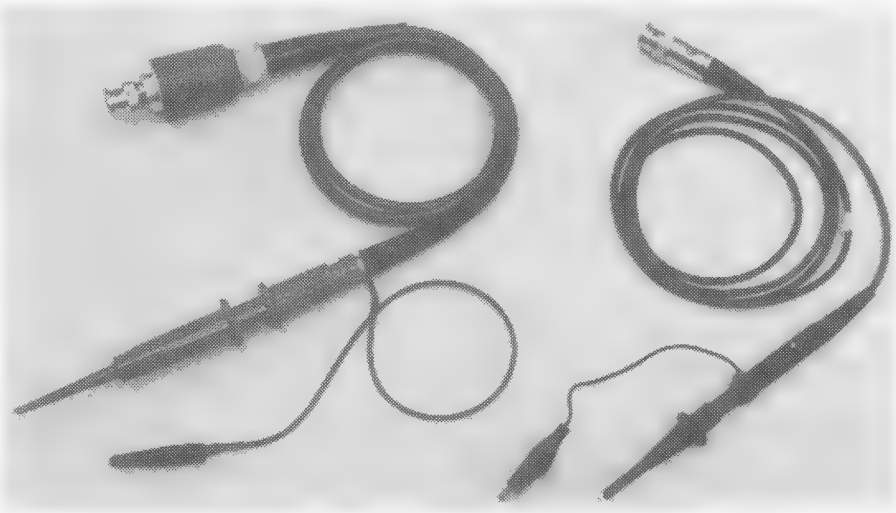

Photo 2. "Tek" X10 probe and X1/X10 probe

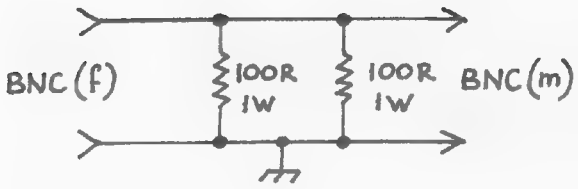


Fig. 2

shows a typical un-processed SSB output signal waveform delivered to the load by an amplifier operating linearly. Note the bullet-shaped peaks and sharp zero crossings.

Let's say the measured Vp-p (as previously described) is 200 Vp-p. Our load resistance is 50 ohms. PEP may be calculated;

$$PEP = \frac{Vp\text{-}p^2}{8 \times R} \quad \text{[Ref. 3, p16.36]}$$

$$\text{Substituting: } PEP = \frac{40000}{400} = 100 \text{ W}$$

Photo 5 shows an SSB output waveform where the amplifier is being pushed beyond its linear capacity. Note the flattened peaks and poorly defined zero crossings. Such a signal, if put to air, will cause substantial splatter interference to fellow spectrum users. The signal sampler may remain in-line during on-air operation of course, with no significant loss of power.

## Checking CW Keying Wave-shape

The set-up of Fig. 3 applies, or the sampler may remain in line when on-air. Photo 6 depicts a nicely keyed CW wave-shape. Note the gradual fall at the end of the dash, then base line zero RF output indicating no "back-wave", and the gradual rise of the following dot. In this example the fall-time is about 10 ms (one division at 10 ms/div sweep), and the rise-time is about 5 ms, which is about right for good "crisp" click-free CW keying.

## Checking Amplitude Modulation

The set-up of Fig. 3 applies, or the sampler may remain in line when on-air. Photo 7 shows the classic near 100 % AM envelope for a sine-wave audio signal. Any deviation from this pattern indicates lack of linearity, or distortion somewhere in the modulator or modulated stage. The presence of squiggles or glitches would indicate possible instability, which needs looking into. Check also for any hum or ripple on the signal by selecting LINE as the trigger source.

Because of the constantly varying amplitude of an AM envelope, it can be difficult to trigger to, and obtain a steady pattern on the 'scope screen. If possible, use a x10 probe to acquire an audio sample from an appropriate point in the modulator and apply this signal to the EXT TRIG connector of the 'scope, then select EXT TRIG.

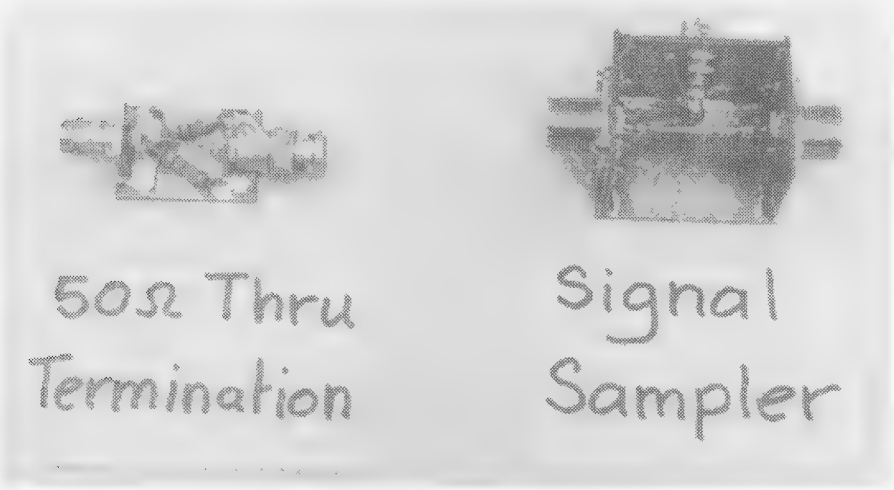


Photo 3. Sampler and 50 ohm termination

## Checking Spectral Purity

A spectrum analyser is the ideal instrument for checking spectral purity. However, a CRO, which has a vertical bandwidth of at least twice the transmitter's frequency, may be used to obtain a pretty good idea as the purity of the output signal.

A "clean" transmit CW waveform is depicted in Photo 1, which shows the output of a 120 W push-pull 1.8 MHz linear amplifier. Sweep speed is 0.1 ms/div. The pure sine shape tells us that any harmonics may be presumed sufficiently low (in excess of -50 dB in this case), and it is likely safe to put such a signal to air. Photo 8 shows a waveform with considerable harmonic content. This signal obviously needs some serious clean-up work. In practice, if the signal appears to have a pure sine shape, then harmonics are probably -20 dB or more down on the main signal.

Another test for spurious output signals is to drop the sweep speed down in steps, and check (CW mode-key down) that the display is a plain band with even illumination throughout (actually a tightly bunched sine-wave at carrier frequency, like Photo 6 but without the keying). Any bright(er) lines, or squiggles upon the top or bottom of the display indicate possible spurs or parasitics, which need further investigation. Caution: at sweep speeds down near 10 ms/div. you may observe some 100 Hz ripple upon the carrier, particularly with valve amplifiers (select "LINE" trigger to observe mains-related events). A level of 5 or 10 % is probably not excessive, and is unlikely to give rise to "T8" reports.

Generally, the frequency of the signal being observed should be within the vertical bandwidth of the CRO. However, that need not prevent (say) a 28 MHz SSB signal from being observed on a 20 MHz CRO, because the roll-off is very gradual, and although the displayed signal level may be down a bit, any modulation or keying wave-shape will still be a good representation of what is actually happening. Furthermore, having successfully checked for transmission characteristics (SSB waveform, PEP, or CW keying for example) at some frequency that is well within the CRO's bandwidth, then, relying on ordinary meter readings, the

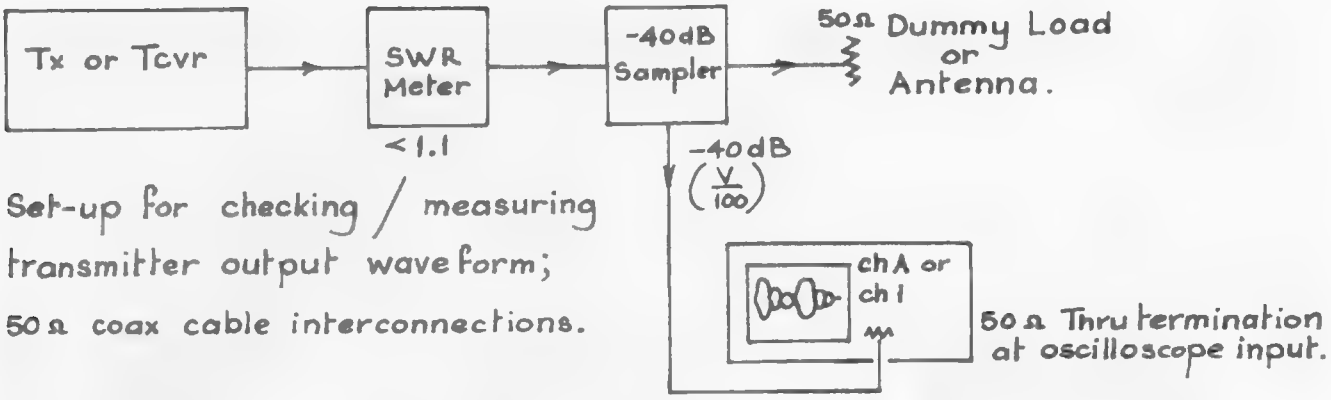


Fig. 3

Photo 4. "Linear" SSB signal

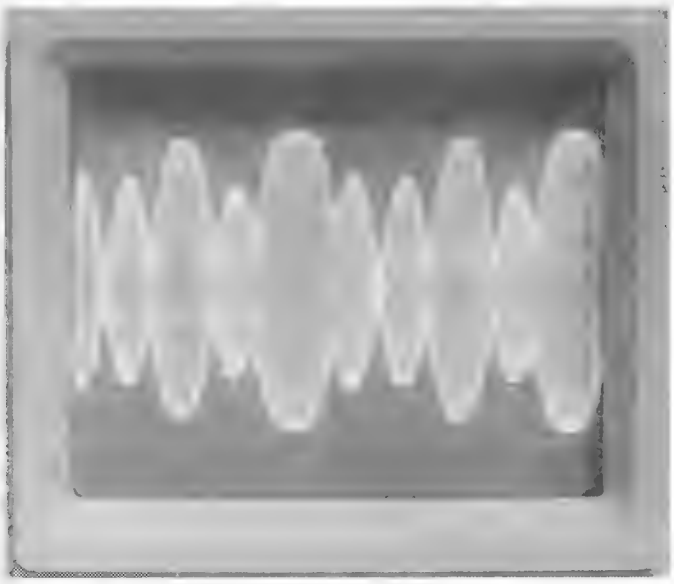

Photo 5. SSB Signal with distortion

Photo 6. Keyed CW waveshape

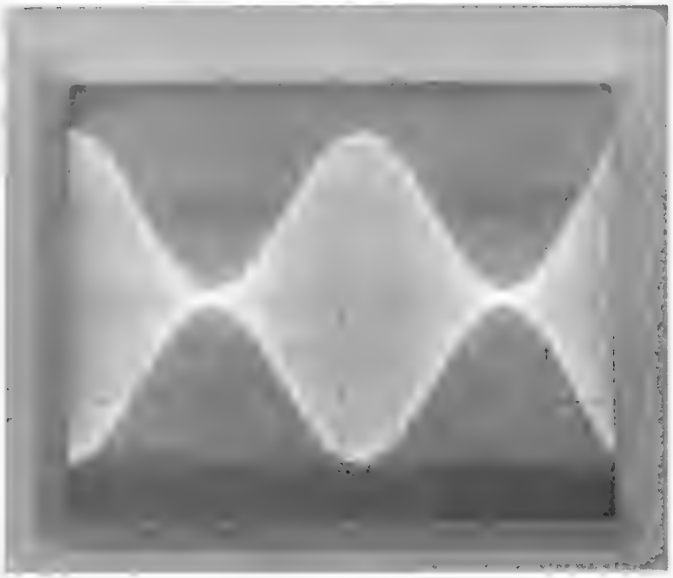

Photo 7. 100% AM waveform

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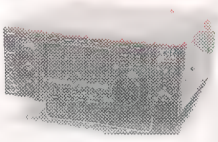
### Ten Tec Jupiter HF Transceiver



The Jupiter is essentially the Pegasus with a user panel. All of the Pegasus features plus a large LCD panel and controls. The Jupiter can be used directly under PC control in Pegasus emulation Mode. The GUI software is available at no charge. The command set for control of both the Pegasus and Jupiter is available allowing you to write your own control software.

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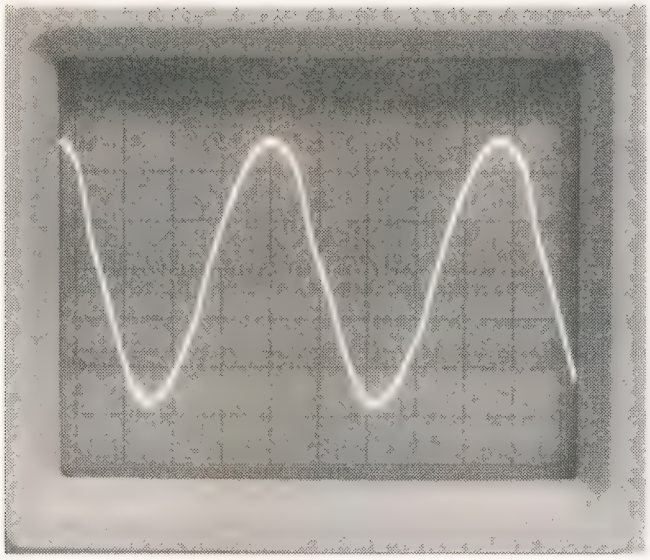

Photo 8. Significant harmonic distortion

transmitter may reasonably be expected to deliver very similar signal quality and quantity on the higher bands.

## Summary

For the amateur with a keen interest in the quality of his or her transmitted signals, and who likes to repair or build radio equipment, the oscilloscope, in the hands of a competent user remains one of the most powerful electronic measuring and diagnostic instruments yet devised.

A typical practical set-up for measuring transmission quality using an oscilloscope has been outlined, together with tested workable formulas for calculating mean (CW) power and peak envelope power (PEP). Samples of typical oscillographic waveforms, applicable to signal checks on radio transmitters are depicted. Some hints are offered on probe measurements – important in radio-electronics fault finding and development work.

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3. Radio Communication Handbook; 7th Edition, RSGB.
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5. Oscilloscopes, how to use them and how they work; I. Hickman, Newnes Technical.


## Further Reading


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2. "Oscilloscope Monitoring"; I. White, G3SEK, RadCom (RSGB), Dec. '94, pp38, 39 (applications of CRO to transmission monitoring).
3. "Instrument series- Oscilloscopes"; D. Bramwell, K7OWJ, Ham Radio (USA) Apr. '90, pp49-57 (general essay on use of CROs).
4. "Visual Aids- Oscilloscopes"; T. McMullen, W1SL, Ham Radio (USA) June '89, pp92-95 (CROs and how they work).


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# 802.11 Protocol and Ham Radio

**Darryl Smith VK2TDS**
PO Box 169 Ingleburn NSW 2565
Ph: +61 412 929 634 Darryl@Radio-Active.Net.Au

**The price of 802.11b equipment is continuing to fall. Once retailing for hundreds of dollars, PCMCIA 802.11b cards are now retailing for under $50. These cards contain sophisticated hardware and software that rivals most of the digital technology used in the Ham Radio world today.**

A hobby has grown out of this technology in computing circles – building antennas and whole networks, operating at high speeds – with little knowledge of sound engineering principles. Antennas that do not resonate and N Connectors crimped with a pair of pliers are just a couple of the examples of the state of the hobby outside the ham radio world.

If Ham Radio is to survive, areas such as 802.11b can be used not only to attract those interested in digital communications, but also as a building block for our own networks.

In this paper I will describe some of the technology, and some of the areas that Ham Radio operators can investigate in order to extend the state of the art.

## Frequency of Operation

802.11b is based on Direct Sequence Spread Spectrum utilizing 22 MHz channels centred from 2.412 GHz to 2.462 GHz. There are only three orthogonal channels available. Another two channels can be used, subject to acceptance of some interference. These devices are licensed under FCC Part 15.

In contrast, Ham Radio in the USA has an allocation from 2.390 to 2.450 MHz, allowing channels centered on 2.412 to 2.437 (Channels 1-6) to be used under FCC Part 97 (Ham Radio) rules.

Whilst Part 15 allows commercial use, it does this with limitations on the effective transmitted power. The power limit is increased under Part 97, but with the requirement for power control under certain circumstances, and for non-commercial use.

In essence, existing 802.11b hardware can be used either under the Part 15 rules, or under Part 97 rules, allowing this technology to be used as a building block for commercial and non-commercial applications.

## Experimentation

802.11b equipment lends itself to experimentation. Several avenues for experimentation exist

- Antennas
- Protocols/Routing
- Hardware Modifications (Frequency/Power)
- Ethernet/USB up the antenna
- Applications (Digital Voice)

## Antennas

One of the great areas of experimentation with 802.11 technology is the design and manufacture of antennas to increase the range of the units whilst still operating within the license conditions. Three types of antenna are popular in the 802.11 experimenters' world.

- Pringles Can
- MDS Antennas
- Vertical Antennas

Some of the antennas being used have distinct problems, such as not being able to resonate efficiently. Combined with 30 feet more RG-213 than is needed, poor results are experienced. However due to the error controls and link margins in the system, the link might actually work.

### Pringles Cans

The best example of experimentation with 802.11b is the Pringles can antenna, where a Pringles can is fed with a short stub, and a number of washers are placed on a piece of steel inside the can. Simple analysis shows that this antenna will not resonate correctly at the low end of the band. This is partially offset by the use of washers inside the can creating an antenna that could be best described as an inverse cavity antenna.

### MDS Antennas

MDS or Microwave Distribution System antennas are popular in areas where the cable for Cable TV is not present. It reduces the economic investment for an operator wanting to get into Cable TV significantly.

In Australia the major MDS company went bankrupt a few years ago, leading to a large number of the Conifer antennas turning up on the 2nd hand market.

Operating at about 18 dBi, these antennas are actually quite effective, and little can be done to these antennas to cause them not to work.

### Vertical Antennas

Several collinear antenna designs are available on the internet, although many of them have problems which lead to less than desirable results. With some effort these designs could be optimized to allow construction to broader tolerances.

### Protocols and Routing

One area that hams should be able to work well on is designing intelligent protocols for 802.11 networks and systems. Routing protocols exist for fully or mostly wireless 802.11 networks, but none have a large following in the field.

Combining some of the ideas contained in the Radio Shortest Path First protocol with traditional wired protocols could yield some promising results. The dynamics of mesh networks do not tend to be as well understood as wired networks.

### Hardware Modifications

One of the problems when attempting to build high speed radio-communications equipment is the RF side. Using 802.11b units as a building block simplifies building equipment.

Several options exist for modifying 802.11b units, provided that they are to be used under Part 97. As discussed earlier Part 97 allows higher power outputs, alternate frequencies and higher antenna gains.

## Increased Power Output

Under Part 97, 802.11b equipment can operate at higher powers. Amplifying the signal is a challenge, since half duplex communications are used on a single frequency. Due to the symmetrical nature of the system it is also no use just amplifying one end of a link. Both ends will need to be amplified.

How do we increase power? The first option is to find a unit that can be programmed in software to use a higher power, such as the LinkSys WAP-11, which can transmit up to 100 mwatt.

Another option is to place an amplifier external to the 802.11b unit. For the amplifier to work, it needs to sense transmit power on the input to the amplifier, and only amplify the signal when power is present and bypassing the amplifier in receive mode.

Whilst this sounds easy, the amplifier must have VERY fast switching times, which may be difficult to realise in practice. One group has reportedly produced a design for this.

One more option involves more research. Many 802.11b units have circuit diagrams available on the FCC web site. Examining these circuit diagrams will show where the power amplifier is inside the unit, allowing a larger device to be installed.

Alternately the transmit/receive switch line could be identified from the circuit diagram, and used to drive an external amplifier.

## Frequency Change

Many 802.11b devices use chipsets that use a couple of frequencies internally. The chipset used on one device from D-LINK uses a reference oscillator, and a separate local oscillator. Changing the frequency of operation is almost as simple as changing the frequency of the local oscillator.

Of course that will only move the frequency within a relatively small range. In order to change the frequency more than that, more drastic changes are needed. The same unit from D-Link has a separate mixer device – combined for transmit and receive.

With some effort the mixer can be changed for an external unit operating at almost any frequency.

Another option is to use a transverter, operating in a similar manner to the carrier sense amplifier mentioned above. In this case 2.4 GHz is used as an intermediate frequency. Since a transverter contains a power amplifier, problems inherent in power amplifiers added to 802.11 also exist in transverters.

## Ethernet up the Antenna

Ethernet up the Antenna is the Holy Grail of almost every computer-literate ham. Cat-5 Ethernet cable is much cheaper than Belden 9913, with significantly less loss.

Putting active devices up the antenna allow the distance between the 802.11b device and the antenna to be so small that even RG-58 could be used without serious losses.

The main point to watch is surge protectors for lightning on the incoming Ethernet cable. To a certain extent 802.11b equipment is disposable, but that does not apply to computer systems.

Unfortunately the cheap devices tend to be not Ethernet, but USB. This is not a problem, since USB cables can be connected up to 25m from the computer. In order to get this far away, Hubs or extension cables are needed.

## Applications

We have now seen how 802.11b can be used, or modified for use, by hams to give us bandwidth. The question then becomes 'How can we use this bandwidth?'

Some answers to this could be

- Digital Video (ATV)
- Digital Audio for repeater linking
- Digital Audio

## Digital ATV

Most parts of the world are using high definition signals with complex modulation schemes for Digital TV. These are currently far too expensive to experiment with, except for those in the television industry, receivers being rare.

This does not lend itself to experimentation. What does, is an MPEG encoded video stream transmitted on an 802.11 transmitter. The cost of equipment is small, particularly compared to the average ATV setup. All that would be required is a cheap WebCam, computer and 802.11 unit with a good antenna. The 802.11 unit could be removed from the equation if the repeater site has a high speed data connection.

Some work is required to implement this since multi-cast protocols would need to be used, but this is an area that could see some experimentation.

## Digital Voice

802.11 is appearing in consumer handheld equipment such as Palm Pilots. A cute application would be to turn one of these units into a HT. Voice signals connect to the local access point, and get forwarded to an IRLP repeater.

## Proximity APRS

In association with Digital Voice is another mode, which I call "Proximity APRS". This is almost identical to normal APRS, but is based on the access point being used by the equipment, rather than GPS position. As a person moves, so does the access point being used, allowing interesting applications. Combining this data with the APRS data stream would not be too difficult.

## Digital Audio Repeater Linking

Many countries have complex repeater linking systems. New Zealand has a system that spans the whole country. With IRLP, a world wide repeater system is becoming a possibility.

Many repeater sites do not have Internet access, or the owners have decided not to join IRLP, but want to connect their repeaters together anyway.

802.11 provides a possible solution. The bandwidth available makes it possible for many channels of high quality audio and signaling information to be transmitted on the same frequency.

Imagine a repeater voting system that contains a multitude of receivers and transmitters along a highway. A system could be designed where the received signals from all the sites are combined in a DSP chip to obtain the best signal, regardless of fading. The DSP would have access to all the audio signals so could 'cut and paste' at will.

## Conclusion

I have shown in this paper that there are non-traditional sources for equipment that the modern Ham Radio operator can use as part of their hobby. I have outlined some areas for experimentation, and some of the applications that are used with the technology.

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# Radio as it used to be

Roger Graham VK2AIV

**Big shack cleanup. Found a floppy disk with an article written six years ago, for our local radio club magazine. Wondered whether other radio operators might share the same sense of wonder that I found at my first glimpse into radio as it used to be.**

Been reading a reprint of "Home of the Blizzard", Douglas Mawson's account of the Australian Antarctic Expedition of 1911-1914. A moving insight into radio as it used to be, when radio was "wireless". The expedition involved two parties, one on Macquarie Island half way to Antarctica, the other at Adelie Land on the main Antarctic landmass. Both parties attempted to set up wireless installations, this in the days of spark transmitters running kilowatts of power, long wave, into antennas on gigantic masts. Not a lot of detail is given about the installations, but it seems that radio was not an undertaking for the faint-hearted 90 years ago. There are two accounts actually... one written by George Ainsworth, in command on Macquarie Island, the other by Mawson himself, from Adelie Land. I've been back through the book and picked out the few sentences that actually relate to their "wireless" activities. Thought you might be interested.

We pick up the Macquarie Island story in December 1911. The ship Aurora has just set down Ainsworth's party on the island.

**December 13th**: All gear for the wireless station was taken to a spot at the foot of Wireless Hill. Several tons of radio gear...masts, engine, cables etc.to be hauled to the top of the hill along an 800-foot flying fox.

**December 26th**: Mast constructed. Pulled it up.

**New Year's Day 1912**: Carried timber from a wreck on the shore, up Wireless Hill to construct the engine hut.

**Late January**: "Daily expected communication with Australia"

**Night of Feb 2nd**: Sawyer reported he had heard the Wellington wireless operator calling Suva station.

**Feb 5th**: Aerial halyard broken (it was a 3 inch rope). Someone has to climb the 90 foot mast and pass a rope through the block. They retrieve deck spikes from the wreck and drive them into the mast to make a kind of ladder.

**Feb 13th**: First contact, with a ship the "Ulimaroa". Great excitement... no longer isolated.

**March 10th**: "Our station communicated with Suva at a distance of two thousand four hundred miles, a remarkable performance for a one-and-a-half kilowatt set".

**May 3rd**: "Hobart wireless station was by this time in working order, a fact which greatly facilitated wireless business"

"From May 12th onwards a daily weather report was sent nightly to Wellington, a distance of eleven hundred miles"

**June**: Big winds... nothing at the wireless station damaged... "work went on as usual. The wind used to make a terrific noise in the aerial wires. Did not affect transmission but interfered with receiving... making it extremely difficult to hear signals".

**Mawson and Ainsworth wrote up their diaries nearly 90 years ago. Months of struggle just to get the aerial up. Kilowatts of power and great rasping sparks. Striving to read faint dots and dashes while the blizzard howled in the wires. Think about it when you press the button on your little black box, and talk to the world.**

Communication was almost entirely at night, though experiments were going on elsewhere.

**July:** "The operator was requested by the Pennant Hills high-power wireless station at Sydney to listen for signals tapped out during the daytime... these tests attended with some success"

**September 25th**: "We heard sounds from Adelie Land wireless station for the first time on September 25, 1912, but the signals were very faint and all that we could receive was 'Please inform Pennant Hills'. Sawyer called them repeatedly for several hours but heard no acknowledgement. Every effort from this time forward... Sawyer remaining at the instrument until daylight every morning"

**September 29th**: Again heard Adelie land. All we got was "Having a hell of a time waiting for calm weather to put up our masts".

It wasn't until the following February that Macquarie Island was able to make two-way contact with Adelie Land, for reasons that become apparent now as we pick up Douglas Mawson's account. Erecting masts had been difficult enough at Macquarie Island in the wind, but nearly impossible in the unceasing blizzards further South.

**Adelie Land, Feb 10th, 1912**: Hut constructed. Heavy foundations laid for the petrol engine and generator of the wireless installation.

**April 4**: "Erection of the wireless masts began in earnest and continued for some months... establish good anchorage... oregon masts (8 inches square) erected section by section... stayed by stout steel cables... considerable wind... frost-bite...

**Early October**... aerial about 90 feet up... began to send messages... some caught by Sawyer at Macquarie Island...October 13 hurricane completely wrecked one mast... not re-erected until January 1913 when supply ship returned.

**January:** " ...a wireless telegraph station had at last been established and we could confidently expect communication with the outside world at an early date".

New wireless operator... Jeffryes... occupied regularly every night listening for signals and calling at intervals. Big spark transmitter... induction effects noted in metallic objects around the

*Continued next page*

# GGREC'S biggest ever hamfest sale

**Hundreds of amateurs from Melbourne and beyond converged on the Cranbourne Community Hall in July for the largest and most successful amateur radio market ever conducted by the Gippsland Gate Radio & Electronics Club.**

The new venue, with around six times the floor space of the old venue, proved to be ideal for staging an event of this kind. Stallholders were pleased with the large tables provided and the buyer attendances.

Commercial stallholders included G & C Communications and Ten Tec, both of whom anticipate good follow-up sales after the event. The large dining area also proved to be a hit. Many amateurs see these markets as an opportunity to catch up with seldom seen old friends over the free tea and coffee provided. Peter Pavey, VK3VB, the GGREC President said that the social aspect of the sale was every bit as important as any financial success we may achieve, hence a lot of space was reserved for the dining area.

The venue has an enormous kitchen facility that had at least six volunteer kitchen staff active throughout the event, maintaining a steady flow of snags, burgers and cakes.

The W.I.A Victorian Division was also represented at the sale, providing assistance and membership information to the visitors. Jim Linton, the W.I.A. Vic Div. President was on hand to draw both the cordless drill kit door prize and the raffle prize of the Icom dual-band handheld. The transceiver was won by John Whittingham VK3XJW, which we will probably hear 'on air' via the new 70cm Club repeater that John has been instrumental in constructing. This win continues his lucky streak, as he also drew the winning ticket for the Club's Christmas hamper in December.

Event organisers praised the efforts of the many Club members who had formed into an extremely efficient team on the day to make the event run very smoothly. Most of them were able to stay and help clean up the venue afterwards.

All forty tables had been booked out some six weeks before the event. It was thought that, after seeing the venue in action, scope for some additional tables placements could exist for future radio markets. It is almost certain that the same venue will be booked again for the *next* Hamfest Sale in 2004, around the same time of year.

Proceeds from the sale will be contributing to the Clubs 'shack building' fund to further the interests of Amateur Radio in the region.

Jim Linton VK3PC draws the winner

The large crowd explored GGREC's Hamfest from top to bottom

## Radio as it used to be

*Continued from previous page*

hut... cook at the stove drew sparks whenever he touched the pots.

**Feb 15th**... excitement... Jeffryes heard Macquarie Island sending coded weather message to Hobart... immediately started the engine... repeated calls... no answer.

**Feb 20th**... call at last reached Sawyer at Macquarie Island... responded "Good evening" at which point the insulation of a Leyden jar broke down and nothing more could be done.

**Feb 21st**... signals exchanged... news out and in. The first news in... Scott and four companions had perished on their journey to the South Pole.

**Mid March**: "Jeffryes and Bickerton worked every night from 8 p.m. to 1 a.m., calling at short intervals and listening attentively... It was now a common thing in the morning to find quite a budget of wireless messages had been received in the night" "It was often possible for Jeffryes to hear Wellington, Sydney, Melbourne and Hobart, and once he managed to communicate directly with the last-named". A coded weather report was sent out each night, via Macquarie Island.

**June 7th**... strong wind carried away top half of main mast.

**July 5th**... winds up to 116 miles per hour... for eight hours, average speed 107 miles per hour. "Early in July Jeffryes became very ill... much anxiety... work on the wireless had been assiduous at all times... continual and acute strain of sending and receiving messages under unprecedented conditions... eventually mental breakdown."

**August 4th**... at last a calm day. Reconstructed wireless aerial on shorter mast... finished by evening. "At eight o'clock Jeffryes, benefited by his rest, was eager to commence operating once more... soon tuned to Macquarie Island... communication unbroken from then until November 20 when interference of continuous daylight caused us to close down".

Mawson and Ainsworth wrote up their diaries nearly 90 years ago. Months of struggle just to get the aerial up. Kilowatts of power and great rasping sparks. Striving to read faint dots and dashes while the blizzard howled in the wires. Think about it when you press the button on your little black box, and talk to the world.

# Technical Abstracts

**Gil Sones VK3AUI**
30 Moore Street, Box Hill South Vic 3128

# Cardboard Box Antennas for Oscar 40

Some cheap antennas which are cheap to make and relatively non critical were described in QST March 2003 by Anthony Monteiro AA2TX. The antennas were built out of large cardboard boxes for the structure with a covering of thin aluminium cooking foil to form the reflecting surfaces. Where the foil is not quite wide enough it can be overlapped by a few inches to provide a wider surface. The 2.4 GHz down converter can be light enough to be direct mounted to the antenna with a simple probe for the feed. This eliminates feedline loss.

The receive antenna is a Pyramidal Horn which for the size given will have around 20 dbi gain. The basic Pyramidal Horn antenna is shown in Fig 1. The dimensions of the horn panels are given in Fig 2. The dimensions are the actual inside dimensions of the horn and you should allow for the thickness of cardboard where they are taped together.

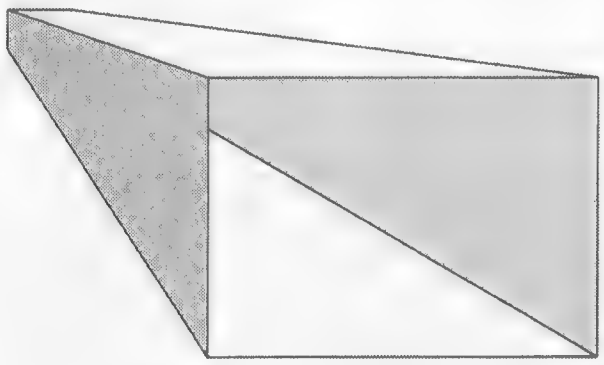

Fig 1 - Basic pyramidal horn used for downlink antenna.

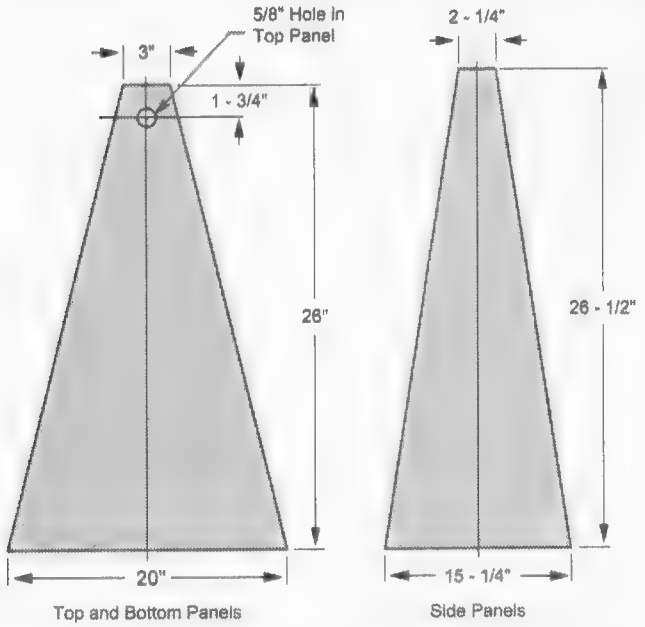


Fig 2 - Dimensions of downlink horn antenna panels.

This will then give you the figure 2 dimensions as the inside dimensions of the horn. You should cut the panels out and then cover them with foil. It may be helpful if the edges of each panel are first taped over before covering with foil. This helps strengthen the panels. The foil covering of the inner side should be folded over the edges and taped in place taking care not to cover what will be the mating edges with tape.

The horn can then be constructed by butting the edges together and holding them with tape. The completed horn structure should have no gaps along the edges where they butt together. Tape tightly any gaps so as to ensure foil to foil contact along each edge. The design can tolerate a few linear gaps no longer than 1/4 inch to 1/2 inch long. This should be fairly easy to do. Any larger gaps which resist taping can be patched by overlapping foil patches taped in place internally.

The horn can be supported by mounting it in another cardboard box. A hole is cut in the bottom of the box and the horn is inserted so that the mouth of the horn fits in the top of the box with the small end of the horn sticking out through the hole in the bottom of the box. The horn should stick out enough to enable you to mount the downconverter with the probe antenna used as the feed on the hole in the rear of the top panel of the horn. Fig 3 shows the final assembly of the horn into the supporting carton.

The down converter is mounted by using the N connector on the input as a mounting. The N-connector is bolted to the hole in the side of the top panel using a nut on the connector thread. The nuts used to mount single hole mount "UHF" and "N " connectors are suitable. The nut should be flush with the top of the connector when mounted to the top panel. To achieve this and also to strengthen the mounting point a number of 2 inch by 2 inch cardboard squares are used on the outside between the N connector mounting on the down converter and the top panel of the horn.

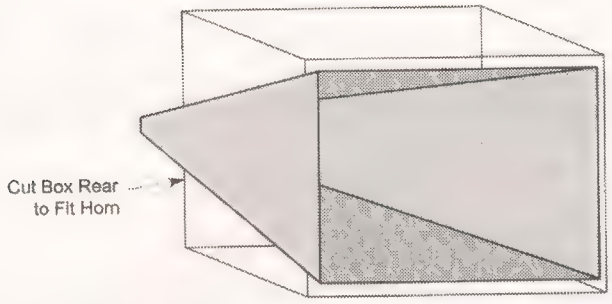


Fig 3 - Downlink antenna assembly showing how horn fits into supporting carton.

The stub antenna or coaxial coupling probe used to feed the horn is a piece of solid bare 14 AWG copper wire inserted into the centre pin of the N connector. This wire size is approximately the same outer diameter as the normal type N connector pin and so should fit nicely without damaging the connector. The wire should be 1.625 inches long and when inserted into the connector should stick out 1.25 inches from the connector. Do not bend the wire.

There should be a fair amount of play in the down converter mounting. Hold the down converter so that the probe is parallel to the back plane of the rear of the horn and tape it in this position. Finally cover the rear of the horn with aluminium foil and tape it in position. The horn is now ready for use.

For an Uplink antenna you can make a corner reflector using cardboard boxes and aluminium foil for the reflecting surface. Once again this is a relatively

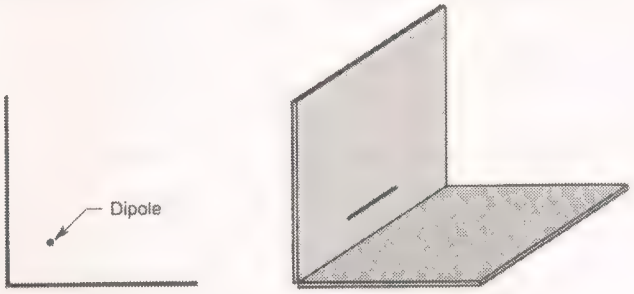


Fig 6 - Basic corner reflector antenna used for uplink. Note dipole feed.


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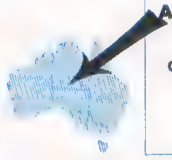

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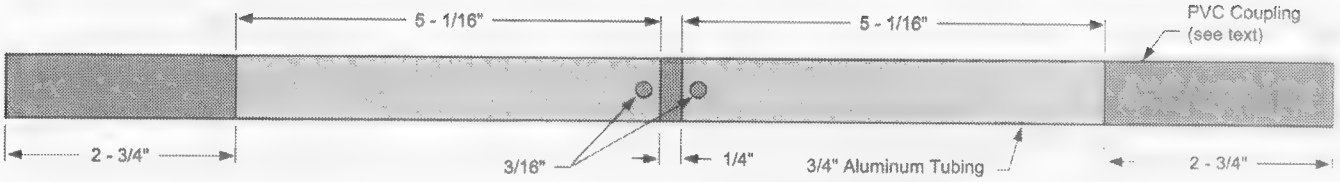



Fig 7 - Dimensions for corner reflector dipole feed.

**Figure 8—Dimensions for the simple uplink corner reflector.**

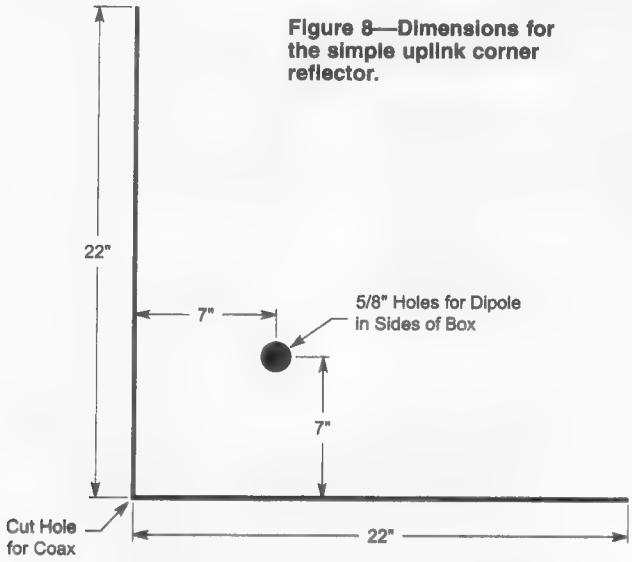



Fig 8 - Dimensions for simple uplink corner reflector.

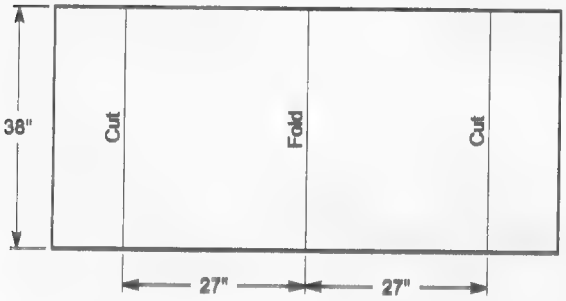



Fig 9 - Cutting details for high performance corner reflector surfaces.

**Radio Amateurs Old Timers Club Of S.A**

**Annual luncheon**

**Thursday 23rd October 2003**

**Noon for 12.30 p.m.**

**at Marion Hotel,**

**Marion Road, Mitchell Park (Bus 243,stop 24).**

**RSVP by 19th October to Ray Deane VK5RK (08) 8271 5401.**

simple and non critical antenna with good gain. The basic corner reflector antenna is shown in Fig 6.

The dipole feed is made from a couple of short pieces of 3/4 inch diam. aluminium tube with insulators made out of the black PVC couplings used in water sprinkler systems. The exact diameter is not overly critical and substituting locally available parts would be OK. The dipole feed assembly is shown in Fig 7. The dipole feed is 50 ohm in the mounting position in the corner reflector. No Balun is needed. Use a short length of RG58 type cable between the dipole and the transmitter. A minimum length would be about 5 feet (1.5 m) but you should use the minimum length needed due to cable losses. The coax should be connected to solder lugs mounted using screws at the dipole centre.

The corner reflector is made by coating two sides of a box with aluminium foil. The dipole feed is mounted through holes in the other two sides, which are at right angles to the reflector sides. The dimensions of the corner reflector are shown in Fig 8. This reflector will give an 8 dbi gain. The reflector size is 22 inches by 22 inches by 16 inches. To obtain more gain a larger reflector can be used which is 27 inches by 27 inches by 38 inches. The cutting instructions for the larger reflector are given in Fig 9. The larger reflector is covered with aluminium foil using a number of overlapping pieces of foil. Be generous with the overlaps and tape the foil down well so as to ensure contact between the pieces of foil.

The reflector is then assembled using tape and other pieces of cardboard to form the corner reflector. The dipole feed is assembled by making a holder like the smaller corner reflector out of a cardboard box. This is then taped in position in the centre of the larger reflector. The larger corner reflector has a 50 ohm feedpoint and will give a 14 dbi gain. Not bad for some cardboard boxes and cooking foil..

# Gate Dip Oscillator

An interesting GDO or Gate Dip Oscillator a modern descendant of the Grid Dip Oscillator was described in *QST* for May 2003 by Alan Bloom N1AL. The design features a two terminal coil and uses common easy to obtain FETs and transistors. The design owes a great deal to a previous design by Lloyd Butler VK5BR which appeared in AR Jan 1997 which is acknowledged in the article.

The GDO is shown in Fig 10. The circuit uses a pair of source coupled MPF102s as the oscillator. An output to drive a counter is provided by the source follower Q3. Q4 a 2N3904 acts as an RF detector and Q5, an emitter follower, drives the meter.

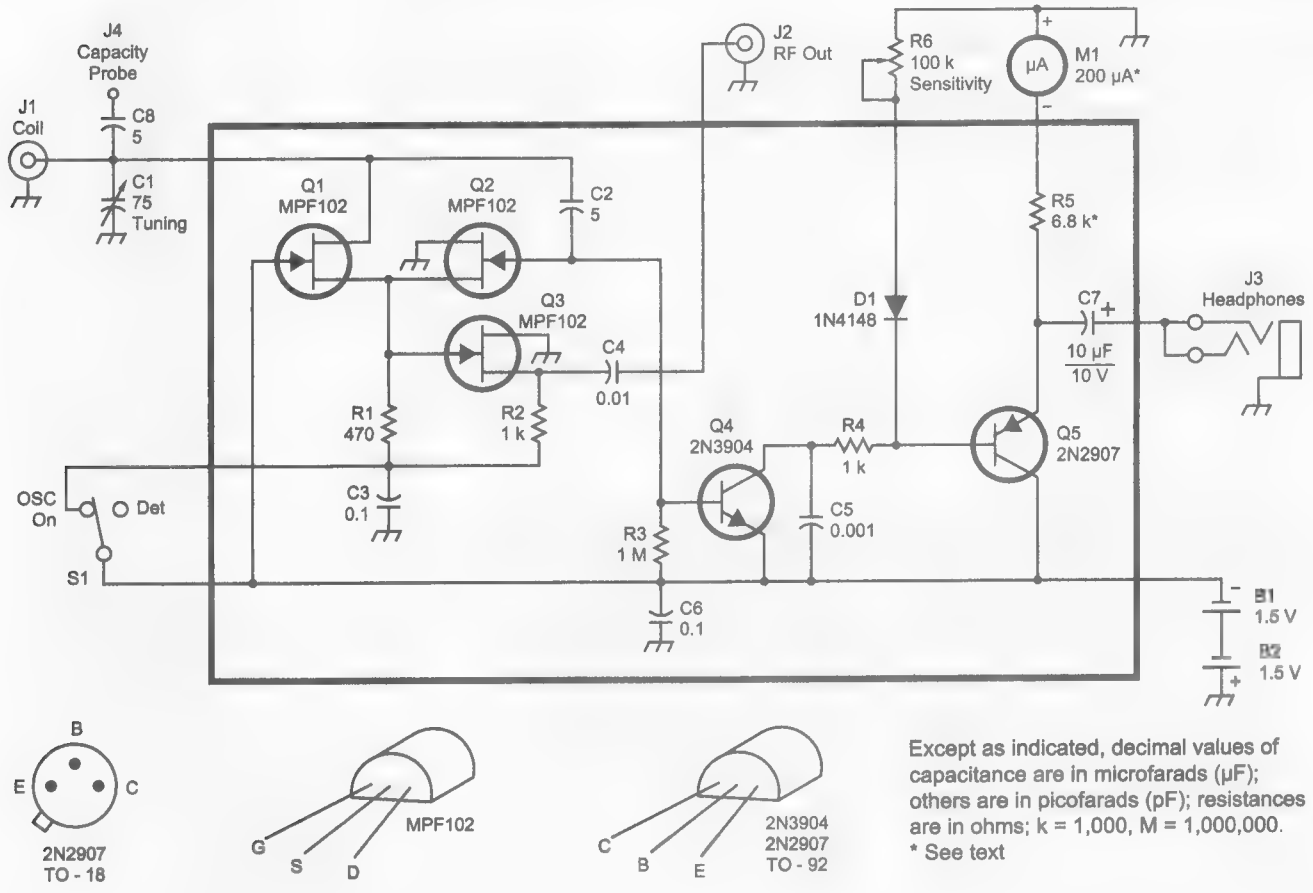
The coils use a BNC connector to provide the 2 terminal plug and socket. The connectors are readily available and much easier to find than other traditional plugs and sockets.

Coil data is given in Table 1. This is of limited utility, as most constructors will use a different tuning capacitor than that used in the original.

Table 1. Coil winding data for GDO.

The coils and frequency ranges are valid for the original design using a 75 pF variable tuning capacitor. They may require adjustment if other components are used.

| Wire Gauge | Coil Form Diameter | Coil Form Length | Coil Length | Number of Turns | Frequency Range |
|---|---|---|---|---|---|
| #12 | 0.375 inches | ——— | 0.125 inch | 2 | 130-150 MHz |
| #14 | 0.5 inches | 1.5 inches | 0.5 inch | 3 | 62-108 MHz |
| #18 | 0.5 inches | 2.0 inches | 0.4 inch | 5 | 29.5-62 MHz |
| #18 | 0.5 inches | 2.5 inches | 0.5 inch | 10.5 | 16.5-35 MHz |
| #22 | 0.5 inches | 2.5 inches | 0.6 inch | 21 | 9.2-19 MHz |
| #26 | 0.5 inches | 2.5 inches | 1.0 inch | 46 | 5.1-10.5 MHz |
| #30 | 0.5 inches | 2.5 inches | 1.5 inch | 100 | 2.8-5.6 MHz |
| #30 | 0.5 inches | 2.5 inches | 1.6 inch | 180 | 1.5-2.8 MHz |
| #30 | 0.5 inches | 3.9 inches | 3.3 inch | 390 | 0.9-1.5 MHz |
| #30 | 1.25 inches | 3.9 inches | 3.4 inch | 230 | 620-980 kHz |
| | | | | (+53 pF) | 505-640 kHz |
| | | | | (=106 pF) | 440-525 kHz |




Except as indicated, decimal values of capacitance are in microfarads (µF); others are in picofarads (pF); resistances are in ohms; k = 1,000, M = 1,000,000.
* See text

Fig 10 - Schematic diagram of GDO.

# Ground Rod Driver

In the Hints and Kinks column of Bob Schetgen KU7G in *QST* for May 2003 a ground rod driver is described which is similar to the devices used to drive star pickets for rural fencing. The idea and design came from Ron Wagner WD8SBB. The ground rods are known as earth rods and are available from electrical wholesalers who supply electricians. They are commonly used to provide an earth point for electrical wiring installations.

The device is shown in Fig 11. The earth rod should be an easy sliding fit inside the pipe but there should not be room for much sideways movement. The aim is to supply the driving force in line with the length of the earth rod and so maximise the driving force without bending the earth rod being driven. The diagram is self explanatory . The weight supplied by the stack of scrap steel is bolted to the top and should be symmetrically distributed about the centre line of the device. Mark the centre of gravity of each weight (scrap steel piece) and align it with the centre line of the driver. Find the centre of gravity by balancing the weights on a smaller object and then mark the balance point. The pipe used will most likely be 1/2 inch water pipe but any suitable steel pipe will do. The length is a compromise between the length of the blow and the nuisance value of the device slipping off the earth rod. A pipe which is too long wont let you drive the rod as far into the ground as it will cease to work leaving the pipe length of the driven rod still out of the ground.

The device is raised up the earth rod and then brought down delivering a hammer blow to the top of the earth rod to drive it into the ground . This is repeated until the rod has been driven into the ground. You raise the driver and on the down stroke you only need to guide it as the dropping weight does the work.

You should wear good protective goggles and heavy leather protective gloves when using the driver. The device has the same driving weight as a mash hammer or small sledge hammer and should be treated with respect. If you doubt the efficacy of such devices just watch a fencing contractor putting in some star pickets. Remember to keep hands and fingers well away from the action except for the essential guiding and lifting function.

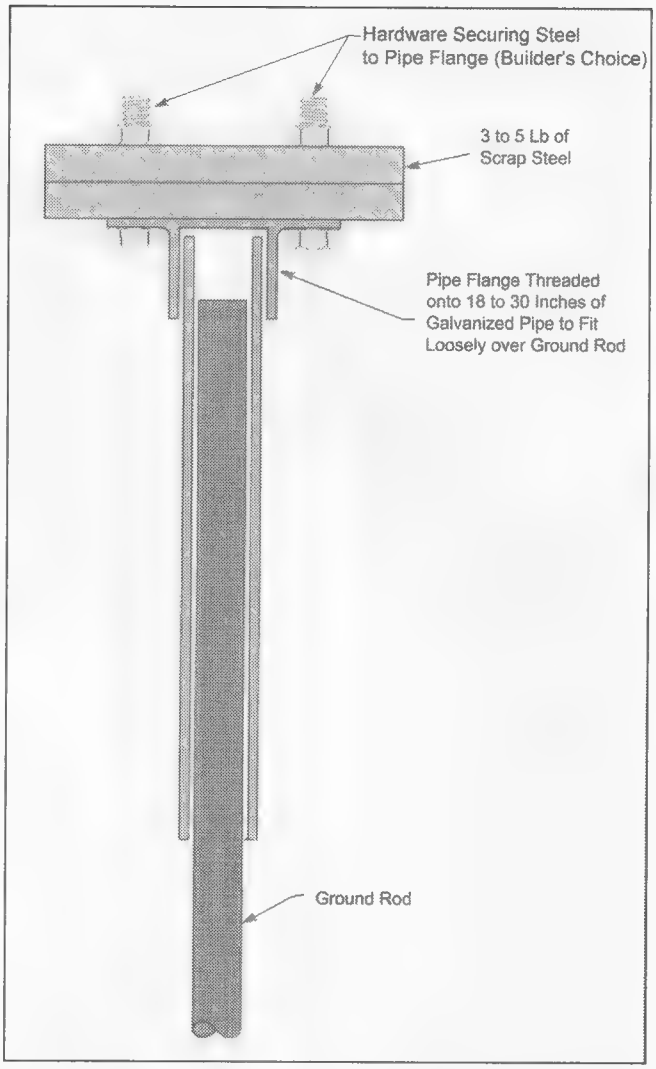



Fig 11 - WD8SBB's ground rod driver slides up and down on ground rods to hammer them into the soil.

# Centre Insulator for Whip Dipoles

In the *Hints and Kinks* column of Bob Schetgen KU7G in *QST* for March 2003 an idea for making a centre insulator for dipoles made from two mobile whips was provided by Roy A. Raney K0OVQ. The idea is to use a large PVC pipe cap as the centre insulator.

A whip dipole is made by using two mobile whips as the two legs of a dipole. In this way you have an antenna which is not dependent on ground and which will be fairly easy to match as most mobile whips have a radiating resistance well below 50 ohm. With losses the low whip impedance rises . By using two whips operating as a dipole a reasonably easy to match antenna can be built. Band changing is by changing whips. In the USA the range of Hamstick whips is simple mass produced and therefore affordable whips. Locally there are similar whips or helicals available. They make a small and inconspicuous antenna not requiring radials in some of the difficult situations where antennas are frowned upon.

Roy K0OVQ mounted two Hamsticks on to a three inch ID PVC pipe cap. He also mounted a Van Gordon balun between the whips secured to the top of the cap using standard whip screw base mounts. The mounts used were the simple single hole mounts used for attaching a whip to a bull bar or similar mounting.

This type of balun is a tube with caps at each end. The top has a suspension hook which is attached by a screw thread and machine nuts. The threaded hook and its attachment to the balun was used to attach it to the Pipe Cap insulator and provide a convenient suspension point. The bottom of the balun has a coax connector to which the feed line

*continued next page*

# Beyond Our Shores

**David A. Pilley VK2AYD**
davpil@midcoast.com.au

**This month I should like to dedicate "BOS" to the RSGB and congratulate them on their 90th birthday.**

Although in 1904 the UK parliament passed the world's first Wireless Telegraphy Act and, in 1912, Amateur Radio was outlined as an experimental and scientific hobby, it was not until July 5, 1913 that a formal Radio Club was formed and known as "The London Wireless Club".

Between 1913 and 1923, which encompassed WW I, other clubs such as the Radio Transmitting Society and the British Wireless Relay League were formed. In 1923 they amalgamated and the Radio Society of Great Britain was incorporated. This name has remained ever since.

In those early days, amateurs really were experimenters. Firstly operating in the low frequencies around 300kHz, then to middle frequencies and eventually to high frequencies. Reading through the history of amateur radio in the UK it was interesting to read that there was a time when amateurs were prohibited from talking to stations outside the UK!

The Society was run entirely by volunteers up until 1939 when John Clarricoats, G6CL, (known throughout the world as "Clarry"), was appointed General Secretary and Editor of the Society journal *"The T & R Bulletin"* which was more popularly known as the "Bull".

The "T&R Bulletin" was first launched in 1925 and was renamed as the *"RSGB Bulletin"* in 1942. Today it is well known as *"RadCom"*.

From the very beginning the RSGB and the then government authority, the Post Office, had an excellent association. To this day they have very close ties with the UK Radiocommunication Agency and we salute them for maintaining such a good liaison.

In 1939, in the UK, there some 2,000 'experimental transmitting' licensees together with 2,000 'artificial aerial' licensees. (Compare that to the 100,000 then licensed in the USA).

WW II saw the radio amateur playing a vital role and many were conscripted into various branches of services that included the "Y" branch and covert operations in enemy occupied territory. Those that were in reserve occupations or outside of conscription age, were given receivers and helped the "Y" service monitor transmissions. Throughout the war, the RSGB continued as an active Society. At one time its Headquarters were at the Clarry's home, before moving to Ruskin House, then Doughty Street in London, before moving in 1988 to their present home at Lambda House, Potters Bar, 10 miles north of London.

Amateur Radio peaked after WW II and membership of the RSGB began to grow fast as ex-service people took an interest in Amateur Radio and found so much government surplus equipment available at very low cost. At that time some service qualifications provided exemption from examination making an easy path to the hobby. By 1985 membership of the RSGB exceeded 37,000, however with the introduction of computers and other electronic equipment the number of Radio Amateurs in the UK has fallen and today there are approximately 60,000 and the membership of the RSGB is around 24,000.

The Society is honoured with HRH Prince Philip, Duke of Edinburgh, KG, KT, as their Patron. It has a Board of Directors headed by President Bob Whelan, BSc, MSc, PhD, G3PJT, with 8 members and 9 Regional Managers and a full time staff of 19 supported by 7 part-timers who look after the QSL Bureau, Museum, Web pages, etc.. The RSGB has one the finest Bookshops in the world of Amateur Radio, which is being added to monthly. Besides the QSL bureau and technical assistance, the Society offers its members credit card facilities, equipment insurance and many other facilities.

To celebrate their 90th anniversary, memorabilia such as 90th Anniversary Pins were struck, together with a Commemorative Mug, an Anniversary Parker Pen and even an Anniversary Ale. Yes an ale with a 4.6% proof! A special call sign, GB90RSGB was issued to various clubs around the country and on the weekend of July 26/27 they celebrated with a Picnic in the Park. If you happened to work one of these stations you can obtain a special QSL card – QSL via the RSGB Bureau.

**Congratulations RSGB – may you enjoy another 90 years.**

RSGB Headqdquarters, Lambda House

## Centre Insulator for Whip Dipoles (Technical Abstracts) continued

attaches. The antenna attachment points on the sides of the balun provide a convenient attachment point for the wires to the whip bases.

You do need the balun. This is a balanced feed point and in a situation where antennas and amateur radio are frowned upon the last thing you want is RF crawling back down the coax outer and wreaking havoc with the neighbours TV's and other electronic goodies.

**ar**

# ALARA

**Christine Tylor VK5CTY**
vk5cty@vk5cty or geencee@picknowl.com.au

## ALARA Contest Logs

The Contest is over. I hope you had a good time and made lots of contacts. Now all you have to do is to send your log to Marilyn, VK3DMS our Contest Manager. Please do send your logs in, no matter how big or small they are.

If we don't send the logs in we will find the committee deciding that the Contest is just too much trouble (I don't think they would, but it is possible). Unless most of the logs are sent in it is difficult to check those that we do have, and it takes away something from the winners of the sections.

The long time format we use that gives us two evenings, along with the repeat contact allowance should make it possible for everyone to get on air and make a few contacts. I hope there were some clubs participating, these add to the fun and give extra people a chance to meet some YLs.

Logs can be sent directly to Marilyn, QTHR the callbook or by email to alaracontest@wia.org.au

## The Birthday Net

Did you forget the Birthday Net or did you start to listen and discover that there was a contest going on at the same time? I wonder?

The Waitakere Sprint was on at the same time as our Birthday Net last year, too, but it finishes at 1100 Zulu and as it means there are possibly some of the ZL girls participating who will stay on a bit longer to talk to us, why not make a few contacts in the Sprint while you wait?

Gwen VK3DYL did this, this year, after which Shirley VK5JSH and Christine VK5CTY had a conversation with her. We were joined by Bron VK3DYF and Dot VK2DB a bit later. Not a large group but with so many regular participants already on the road heading North for the winter, it was not surprising. Unfortunately we did not hear any ZL stations but Gwen said the band was very noisy for the Sprint.

Anyway, think about the Waitakere Sprint as well as the ALARA Birthday Net next year.

## VK5 Birthday Luncheon

Despite the travelling ones we had eight YLs and five OMs at the Marion Hotel for the birthday. Apart from the regular Friday lunchers, Jean VK5TSX, Maria VK5BMT, Sue Mahony, Shirley VK5JSH and Christine VK5CTY we had long time members of ALARA, Myrna VK5YW, Lorraine VK5LM and Janet VK5NEI.

It was a very enjoyable lunch and despite worries that we might have to vacate our table for more diners, we were left in peace for as long as we wished.

A very old photo (from the 1970's) was passed around in the hope that someone would be able to identify the associates grouped there, but not many names came back. Isn't it interesting how we recognise the faces but lose the names?

Unfortunately VK5 is the only state, now that celebrates the ALARA birthday with a luncheon, but we are glad we live near enough to each other to be able to do so.

Janet VK5NEI

Lorraine VK5 LM

## The Old is also the New

On the Birthday Net Shirley VK5JSH spoke of a YL net she had discovered. She had had several contacts with both adult YLs and with some Guides, on the afternoon she found the net. She was delighted.

However Gwen pointed out that that particular net had been running for about 30 years. The old for Gwen is the new for Shirley, the way things always are.

The net in question is the ANZA net. It is run on Friday, Saturday, Sunday and Monday on two bands. It is on 14.183MHz in the 20 metre band at 0530 Zulu and on 21.205 MHz in the 15 metre band at 0545 Zulu. The net controller was Barbara NH7FY in Hawaii when Shirley heard it but it is possible that there is a roster of operators.

Have a listen around and join in. I am sure they would be delighted to have you.

## JOTA is approaching

Don't forget JOTA is on over the third weekend in October. If you are asked to supply some radio equipment, try to help. This weekend is a marvellous way to introduce young people to our great hobby.

A large number of current operators had their first taste of radio at a JOTA weekend.

With the Australian version of a foundation licence on the discussion board there will never be a better time to give boys and girls the chance to make a radio contact for the first time.

I know there are quite a few YLs who regularly participate in JOTA. Please let me know about your station. Others are interested, you know.

## Travellers' Tales

Recently Bev VK4NBC spent several months in Central Victoria with Judy VK3AGC to help Judy manage things after she had her wrist broken and repaired. It was just before she was to go to Perth for the 1997 ALARAMEET that Judy broke her wrist. It never mended correctly so she decided that rather than have a wrist she couldn't use properly she would have it redone. She was very grateful for Bev's assistance during her recovery.

But, when it came time for Bev to go home, the two of them decided to go from Central Victoria to Brisbane the long way. They covered 8,000 km in 12 days and had a ball!!. Now they want to do it all over again.

What a great idea!!

This is when so many southerners take off for warmer climes. Many of them use the Travellers' Net to keep in touch.

Leslie XYL of Hans VK5YX was very glad they were in the habit of talking to VK6HH and others each day. They had a tyre blowout on a dirt road. Not an unusual happening though one you would rather not experience. When they went to replace the blown tyre with the spare, however, they found that the spare was flat!

Through Roy and the net they were able to arrange for someone to come out from the next town to get the damaged tyres and to have them returned to them.

They did have to spend a day sitting on the side of the road watching whatever traffic there was, go by. But they sat there with the knowledge that amateur radio had come to the rescue and that they were to be on their way again more quickly than they would have been without it.

## Some interesting feedback

An email recently asked me for the source of the little story I told in this column at the beginning of the year, about the young couple who fell in love through messages they exchanged in "dots" and "dashes" back in the very early days of radio.

I gave the OM the magazine reference for the story and was delighted when he messaged me back that he has been successful.

It was Barrie VK6BR, a member of the Morsecustodians Fraternity of WA. Affiliated groups hold yearly displays in most cities at which they use old Morse Keys to send old-fashioned telegrams for people. Do you remember sending or receiving telegrams? The current generation will never know what a telegram is.

In Adelaide the telegraphists display is usually put on in one of the big city stores. Watch for the advertisments for the event and go along to visit and admire the "old ways". It can be quite an eye-opener to see and remember how it used to be done.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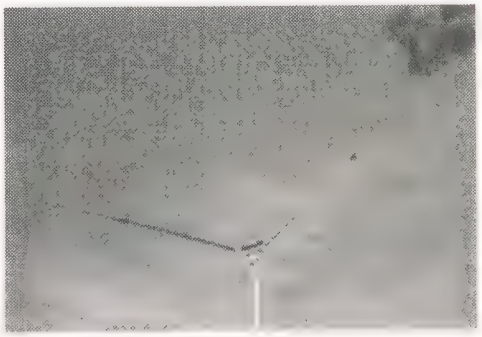

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# Division News

# VK1 News

## Forward Bias

Peter Kloppenburg

Low Interference Potential Devices (LIPDs) have had a bad press with users of 70-cm repeaters ever since they were allowed to operate within the 70-cm band (433.05-434.79 MHz). However, LIPD bands are allocated on 20 other slices of the spectrum, but with a maximum of 1 watt on only two bands (26.957-27.283 MHz and 40.66-41.00 MHz).

It is the latter, 40.66-41.00 MHz, that is of interest to Gerard Borg, our guest speaker on Monday, July 27, 2003. Gerard lectures at the Australian National University in Canberra, where, among other duties, he heads a research project entitled Local Area Networks for the Bush. (BUSHLAN). Gerard spoke to the subject of BUSHLAN and explained the concept of it and the research that he had done sofar. He said that with digital TV taking over from analog TV, Channel '0' and '1' will become redundant within the next five years as the occupiers of these channels will move to the VHF bands. This means that Channel '0' (45-52 MHz) and Channel '1' (56-63 MHz) will become available to other users! Gerard's concept is to use 7 MHz of bandwidth in either of these channels to provide communication services to country towns or districts which are at present too remote or sparsely populated for on-line services. As the LIPD 40.66-41 MHz band is the nearest band that can be used for scientific research, Gerard has been, and still is, conducting and testing propagation models on 7.317 metres in the ACT and surrounding district with encouraging results. With a vertical dipole on Mount Ainslie and 40 watt of RF power, modulated with a pseudo random code, he has recorded signal strength levels at many different points around Canberra. As amateurs, we knew exactly what he was talking about because we have "been there and done that" at one stage of our lives. Because of this, there was a healthy interchange of experiences between Gerard and those of us with a professional background, such as Paul Bell, VK1BX, Richard Elliott, VK2KDE, Alan Hawes, VK1WX, and Chris Carroll, VK1GG. Because Gerard is experimenting with communication protocols such as X25 Packet software, Chris offered him a substantial quantity of TNCs and other modems to help out with Gerard's limited funds.

The Australian Ladies' Amateur Radio Association (ALARA) is thirty! To help celebrate the occasion, the Division has offered to pay the membership fee for one year to all Women Radio Amateurs in the ACT and surrounding district. To date, letters with the offer have gone out to the following: Sandra, VK2LSH; Ruth VK1YL; Linda, VK1HLT, Linden, VK1LSO: Robin, VK1ZBF; Marion, VK1MG; Irene, VK1NDV; Laile, VK2LO; Marion, VK1BNG; Leisa, VK1LC; and Ruth, VK1ZBE.

The Division now offers family membership to immediate members of an 'F'-Grade member. These include fathers, mothers, sons, and daughters. The fee for family membership is $38.75. This excludes the AR journal, but provides for all the rights and privileges due to a member of the ACT Division. Copies of membership application forms can be downloaded from the divisional Website at: www.vk1.wia.ampr.org and should be sent to the divisional address.

***News Flash!!!*** The Committee has decided to hold a Trash & Treasure sale on Sunday, October 26, 2003. Buyers and Sellers are welcome at the Parks & Garden Depot compound in Longerenong St., Farrer, starting at 12 Noon. Some of the items on sale are mantel radios from the Thirties and Sixties, Coms. Receivers, test equipment such as signal tracer: VTVM; valve tester, TV sets, CB transceivers, VHF antennas, antique valves, FM-828 mobiles, and lots more

The next general meeting will be held on Monday, September 22, 2003 at Scout Hall, Longerenong St., Farrer, at 8.00 pm. Bring a friend. Cheers.

# VK2 News

Tim VK2ZTM

Welcome to spring. If you took part in the recent R. D. Contest we hope that you sent in a log to help our Division. Our Special Event Station VK2WHQ took part under the supervision of Steve VK2PS.

The VK2 Bookshop continues to maintain a wide range of publications. WIA members through out Australia have the advantage of a further discount on most lines. Interstate amateurs may need to confirm their membership before placing orders. The VK2 Division 1 800 number only operates within NSW. Call by mail, telephone, FAX or internet. The Bookshop has a few WIA analogue wrist watches available as well as a WIA key ring. QST is one of the magazines stocked.

The VK2WI operators roster for the final quarter of 2003 will be drawn up this month. Again we seek additional personal for both the morning and evening sessions to ease the work load. VK2RSY, the Dural based beacons, are a major portion of the site's power bill. While we understand that some operators do make use of the service, few take the time to send in a report. These reports can be sent in by the internet. We get a few for the 10 metre unit on 28.261 by internet. While the sunspot cycle is now declining it shows that 10 opens from time to time. The 6 metre unit on 52.420 is one of the last still on 52 MHz. Jack VK2GJH advised that while the winter is quiet for 6, VK2RSY has been observed in VK4, 5 and 7, ZL and FK8. In early August the two metre beacon did in a transformer in the power supply. The smoke detectors did the right thing and alerted security and in

turn the Dural personal. Naturally, it did it in the middle of the night. All automatic services were shut down but it took a couple of days to locate the source. While little may get burnt, the smell gets into everything.

One service provided on behalf of the Division is slow morse training. Besides the automatic system on 80 and 2 metres, which now resides at Dural, there is the group of volunteers who provide 80 metre - 3550 kHz - VK2BWI live sessions, many evenings per week. Ross VK2ER co-ordinates this activity. He was wondering about the future of the service once the requirement of CW as an exam subject is determined. Divisional Council discussed the subject at their July meeting and concluded that even when it is removed from the exams, there will be those who would like to learn it. They encourage the continuation of both the manned and automatic services as long as there are those able to provide the facilities.

John Turner VK2WRT has retired from the position of Divisional Councillor when he heeded his Doctor's advice to slow up a bit. President Brian VK2WBK thanked John for his time on Council and for his work with Trash and Treasure and as Dural Officer. His place has been filled on Council by the cooption of John Vetters VK2JJV with the portfolio of Dural Officer. Council may be holding its October meeting at the Wagga Field Day if there are enough for the quorum. The Wagga Field Day will be over the long weekend – 4th and 5th. The Divisional office may still require the services of someone with MYOB skills for about 4 hours per month.

Members are reminded that the Parramatta office is open three days per week, Tuesday, Thursday and Friday. It is also open on Trash and Treasure Sundays and the first Tuesday of each month when the Home Brew Workshop is conducted. These will be Sunday 28th September and Tuesday 7th October.

Affiliated Clubs are reminded that the annual insurance renewal is coming up. Some Clubs did not respond to the request to update their affiliation details. The next Conference of Clubs will be Saturday 29th November. Council at their July meeting discussed and drew up the operating procedure for the handling of Deceased Estates. The Parramatta office has some VHS format technical tapes which may be borrowed. A list of titles may, by now, be on the Divisions web page. The Library, as most members will know is quite extensive with its range of publications, both magazines and books. However, little use is being made of it. This may be due to you not knowing what is there or you may have enough information in your own book collection. There is a detailed hard copy index system. It may be possible to make some of the index available via internet. Members are invited to indicate if they would make any use of an index service on the net. A lot of information may be found on the Divisional web pages. Check them out.

# VK3 News

**By Barry Robinson VK3JBR**
WIA Victoria web site: www.wiavic.org.au
email: wiavic@wiavic.org.au

## A great effort and result

The amateur radio display at the Great Australian Science Show (GASS) 2003 was an enormous success, and a credit to those involved. Full story with picture is on inside back cover

## LIPDs – time for action

The interference now being experienced by 70 cm repeaters from LIPDs (low interference potential devices) is adversely affecting the repeaters in several ways.

In VK1 a repeater constantly triggered by an LIPD reportedly resulted in its final stage failure. Among the other repeaters suffering LIPD interference are VK3ROU on Mt Dandenong, and VK3RPU at Arthur's Seat.

These last two WIA Victoria repeaters are also used for IRLP, but the LIPD problem will or has already resulted in the IRLP masters in Canada temporarily closing their node access due to the interference. The noise generated by LIPDs that opens these repeaters is unacceptable for the IRLP network.

The finger is being pointed at WIA Victoria to fix the problem. However, the only long term solution is for the draft revised 70 cm band plan to get approval so that the repeaters can be moved away from the LIPD allocation which currently includes repeater input frequencies.

Support for the new band plan has been received from VK1, VK7 and VK5, who agree with VK3 that a realignment of the repeater sub-band is required. But others don't agree basically because they don't have LIPD interference (yet).

There will be a cost involved in shifting the frequencies of the repeaters. WIA Victoria is of the view that the ACA should waive any charges related to site frequency coordination.

## Attending club events

The Sunraysia Radio Club AGM in Mildura was a great opportunity to meet club members and talk about the issues affecting amateur radio in Australia.

The club is preparing itself for the new entry level licence expected to begin in early 2005, and looking at opportunities to promote itself in the local media. It has a regular item on the Mildura community radio station which is getting results.

WIA Victoria President, Jim Linton VK3PC was special guest at the AGM, and talked about EMR, licence reform and the end to the Morse code requirement for amateur licences.

The entry level licence was explained, including the expected requirements to be met to enable clubs to provide the training, assessment and mentoring aspects of the licence.

As part of WIA Victoria policy councillors will be visiting as many club hamfests as practicable.

Earlier this year WIA Victoria councillors attended the Healesville, Midland (Castlemaine) and Cranbourne hamfests.

A roster has been drawn up for the Shepparton Hamfest on 14 September, and Ballarat Hamfest, 2 November. Please visit the WIA Victoria table at these events, say "hello" and feel free to discuss any issue of concern or interest.

# VK4 News

## Qnews

By Alistair Elrick VK4MV

## Sunfest

The Sunshine Coast Amateur Radio Club Hamfest will be held in the Woombye School of Arts on Saturday 13 September 2003, from 9 to 3. The venue will be open to exhibitors from 7.00 am with food and refreshments available from the kitchen. Entry fees are $5.00 single and $6.00 family. Table bookings are $15.00, which includes entry for two persons.

The hall is located in the centre of Woombye township just 100 metres from the railway station. Ample parking is available. Entry ramps provide easy access to both halls. A talk-in service will be provided on 146.850 MHz FM. Call VK4WIS for assistance. Further enquiries to the Co-ordinator Sunfest, Ron VK4GZ. Phone 07 5448 4063.

## 'THE' Convention

### North Queensland Amateur Radio Convention 2003

North Queensland Amateur Radio Convention will be held 19th, 20th and 21st September. At the TARC Management Meeting on 1st July, members appraised a number of issues regarding the plan to have part of the Convention as attending the Townsville Skyshow. Concerns included the costs of public risk indemnity, the logistics of getting hams through large crowds and a dislike of most hams to be situated in large noisy crowds. Once the concerns were reviewed it was decided to go with the traditional program.

The following are activity highlights of the NQ Convention: Friday evening 19th September - official opening of Convention at Centenary Hotel. Saturday 20th - registration, trade displays, lectures, demonstrations, home brew entry and judging, convention banquet. Sunday 21st September - QNEWS, WIAQ seminar, car boot sale, trade displays, monster auction. Attendees requiring accommodation need to book it NOW - it's a big weekend in Townsville during the Convention weekend and accommodation will be scarce.

A popular feature will be on again this year. The Car Boot Sale will be happening on the Sunday morning in the University Hall Carpark. It costs nothing to display your wares; the only condition is that you be colourful and outward going with your display. You have to talk it up and show some showmanship. That way you attract more prospective buyers ! It also costs nothing to come along and check out what's on sale.

Deadline for Convention registrations, which gets you access to catering, is August 29th.

The Convention info pamphlet and registration form, is available on request from vk4wit@wia.org.au or downloadable from www.wia.org.au/vk4

If you are travelling to Townsville for the convention weekend, consider also taking in the Central Highlands AGM the following weekend - details below or at http://www.vk4tub.org/charc.htm

## Central Highlands ARC

This is the weekend after 'THE' Convention. The 2003 Central Highlands Amateur Radio Club AGM and Monster Auction will be happening at Camp Fairbairn near Emerald QLD from 5pm Friday 26th September to Midday Sunday 28th September.

Day visitors' entry fee is $6.60 (inc. GST) per person (5 years old upwards - under fives are FREE). For people wanting to stay Friday and Saturday night there is dormitory accommodation available at $13.20 (inc. GST) per person per night - supply your own sheets, blankets and pillows.

A pay-as-you-eat BBQ will be put on by the Club on Saturday Evening and a pay as you recover breakfast will be available Sunday Morning (costs to be advised - but please advise attendance for catering). Other meals are the attendees' responsibility.

Please do not arrive before 5pm Friday afternoon. If you arrive during school hours, you will be sent back to Emerald to while away the hours window-shopping!

Note that those attending in camper vans, mobile homes etc, will need to see the caretaker on site prior to setting up.

Note that Education Queensland, the operators of Camp Fairbairn, nor the Central Highlands Amateur Radio Club accept any liability for injuries etc. You attend responsibly and you are responsible for your own well-being.

Please send cheques or money orders for payment to - Gordon Loveday/ VK4KAL, details below. Credit Cards not accepted!

### 2 ways to get there:

**Way 1.** From Emerald, take the Road to Springsure, turn off at about 18km south (the way is well marked), travel a further 6.8km and turn IMMEDIATELY LEFT at the grid and then follow the bitumen road.

**Way 2.** Heading west from Emerald, turn left over railway near Industrial Estate into SELMA Road, you might need to call on VK4RSP 146.825MHz (-600kHz split) for final directions.

Keep going beyond the advert for Lake Maraboon Village Resort for about 3km. The Camp Fairbairn turn is on the right near the cattle grid.

We hope to hold the AGM, followed by the Monster Auction on Saturday Evening. Treasure Donations gladly accepted!

Need more info? Contact:
Gordon Loveday VK4KAL
Hon Secretary/Treasurer
Central Highlands Amateur Radio Club
C/- Aviemore, Rubyvale, QLD, 4702
Phone 07 4985 4168
email donvk4kal@bigpond.com

## JOTA Planning

Scout groups in the Kennedy region and Guide groups in the Flinders region have started contacting their regular radio operators for the 46th JOTA, which is happening on the 18th and 19th October 2003.

Information to hand so far -

- Alice River Scout Group with operators Phil VK4HSV and Les VK4ALS operating at Alligator Creek Camping Grounds
- Kirwan Scout Group with operators Lyndall VK4ZM and Gavin VK4ZZ operating at Linger Longer - Camp Tarmaroo Bluewater.

Groups intending to operate with a specially issued JOTA callsign need to get the necessary paperwork in PRONTO to avoid disappointment !

**73's from Alistair**

# VK6 News

73 Neil
VK6 QSL Bureau Manager

The VK6 QSL Bureau has from time to time, shown some stats as to the number of QSL cards that have passed through it. The following are figures for 2002 and are read as follows...country/no. of cards recd/no. of deliveries for the year 2002.

**JA**/3603/12, **DL**/2730/6, **UA**/1653/7, **W**/1332/3, **I**/1080/2, **F**/683/1, **SP**/570/5, **OK**/470/3, **9A**/450/1,

**HA**/403/2, **SM**/393/1, **S5**/352/2, **PA.ON**/369/3, **LA**/345/1, **OH**/280/1, **G**/255/1, **A4**/133/1, **HL**/125/1,

**HB9**/88/1, **OZ**/60/1, **BV**/53/1, **EW**/37/1, **CT**/30/1, **PY**/30/2, **9V**/17/1, **NZ**/10/4, **YL**/7/1, **VR2**/6/1,

**YO**/4/1, **Z2**/1/1.

Unfortunately, a high percentage of the 15526 cards are not collected by the VK6 amateurs. This is no doubt due to many reasons, probably too many to list here. It would help the bureau if the incoming cards could be reduced in number by the amateurs stating that they do not send or reply to QSLs.

Of some interest is the "standing" on the ladder of the Bureaux that sent cards last year. You will notice that not all Bureaux are listed, as simply no cards were received from those not listed. It is not unusual to have cards delivered that may have accumulated in a bureau for two years before being posted. One package received recently from a European country had cards dated 1985! Perhaps the amateur had just got around to catching up with his QSLing.

Postage has increased in most countries and it is now commonplace to receive packages weighing 1, 2 or even 3 kilograms. As a rough estimate, about 300 cards weigh approx. 1 kilogram. The VK6 bureau posts its outgoing cards to the VK2 QSL Bureau for forwarding, VK6 does not generate enough cards to have economical postings, especially to the countries with which VK6 have very few contacts. Sending cards to VK2 incurs a cost for their handling, as well as posting to VK2. This procedure ensures that cards do not languish in the VK6 Bureau.

A plea to the VK6s who use the bureau.....when having your QSL cards printed, keep the weight at 3 grams or less per card. Do not laminate them, use lightweight paper, etc., as some societies are now using automatic sorting and the machines do not think like humans, yet. And another plea, write the callsign of the recipient on the back of the card, in legible printing. It helps in the sorting process.

# VK7 News

The last couple of months have seen some notable birthdays! Ted Burne, VK7GB celebrated his 90th and John Rogers, VK7JK celebrated his 80th. This has also highlighted VK7's oldest amateur in Pat Geeves, VK7GV who is 93 years young!

## Branch Meetings/ News

The North West branch held a business meeting in August and had a good attendance. Tony, VK7AX and XYL, Rosemary have returned to Tassie and so the Monday night WIA Tasmania Branch and QNews rebroadcasts have resumed. These broadcasts can be heard on most of the Northern Tasmanian 2 metre repeaters at 1930 (local Tasmanian time). If you listen either in Tasmania or Victoria, to this rebroadcast then please call back to let the organisers know. The NW Branch also viewed the video of the Bob Whelan talk to the NSW Division on the UK entry-level licence. This caused some very positive discussion around the room. Altogether it was a very worthwhile evening despite the weather.

At this month's Southern Branch meeting Richard, VK7RO, the Divisional Historian entertained us with his comprehensive history of the Tasmanian Division. Richard has been compiling the history from minute books, newspapers, articles and talking with and documenting member's recollections. His talk started with A.H.Medhurst and W.P.Hallam contacting visiting warships in 1901. The first official meeting of the Tasmanian Division occurred in Hobart in February 1923. In 1924 the 1st AGM was very lively! A split occurred in the course of the meeting *"which some blood was spilt and a black eye told its tale"*. In 1925 the WIA Division was incorporated in Launceston and the AOCP examination introduced. In 1927 the PMG advised the bands were 8-10, 23, 32-33, 36-37 and 85-95 metres. In 1928 the WIA Federal Convention was held in Hobart for 5 1/2 days. This also occurred in 1935 & 1967.

Richard Rogers, VK7RO, WIA Tasmanian Division Historian giving an illustrated talk (see below) to the Southern Branch on the sometimes fiery history of the Division.

There are also a number of emergency events that are documented where amateurs helped authorities. The 1929 floods was one such occasion where 7DX, 7CW, 7HL, 7BQ, 7CS helped the PMG out with telegraphy. Another such event was in 1932 when 7CW, 7GE 7WM were commended for assisting when the Launceston to Melbourne cable broke down.

Field Days were the go and many were

*Continued on page 44*

# REMEMBRANCE DAY Contest

## RD Contest 2003 address

**Presented by Col Harvey, Group Captain RAAF Retired, VK1AU**

**Col was introduced by Ernest Hocking, VK1LK and Lt Commander Peter Ellis RAN, VK1KEP**

Col Harvey VK1AU as Squadron leader, RAAF

It is 58 years since the WIA Council decided to honour amateurs who lost their lives in WW2. At that time most amateurs knew one another.

Then all were equal. You were either an Amateur qualified by the AOCP, or you were not!

Now it is only Old Timer octogenarians who have direct knowledge of some of those we honour tonight.

Our Honour Roll is not based on sacrifice, but on the spirit of ANZAC. It is about courage, endurance, and bravery in the face of dreadful odds.

The radio amateurs we honour grew up in post -depression years when money was scarce and most wireless equipment was scrounged or home made.

To be a successful scrounger amateurs needed to be observant, inquisitive, innovative, friendly and helpful to one another. There was a high level of mutual respect because all had taught themselves Morse and most were, by the outbreak of war, proficient enough to be of immediate interest to the military authorities, albeit for a pittance. Ten shillings and eightpence a day in the RAAF rings a bell.

**Our Honour Roll is not based on sacrifice, but on the spirit of ANZAC. It is about courage, endurance, and bravery in the face of dreadful odds.**

There are 14 men on the WIA Honour Roll who became silent keys through contact with an enemy.

Not forgotten are those who died by accident or of ill health. One was Cpl Phillips B.E.M, VK5BW, decorated for exemplary conduct and devotion to duty in the 2nd AIF in Syria. Then a Cpl., he carried tremendous responsibility. Working 20 hours a day whilst unwell, he refused to leave his post in charge of all wireless communications for 21 Aust. Infantry Brigade. He maintained contact with Navy, Cavalry, attached units, and Battalions of the brigade over a wide range of frequencies.

A radio engineer, he enlisted in the AIF as a Private returning to Australia as a Sgt. only to be killed in an Army vehicle roll-over accident in 1943. A sad loss to all concerned.

There is a story about a message supposedly passed to a Commander to the effect that his Company were "going to a dance" when what he expected to be told they were going to advance!

None of the operators we honour tonight would have allowed a signal to be signed out as "Received", or acknowledged with an "R", unless certain of accurate reception.

Insistence on accuracy was legendary amongst professional operators.

Then, unlike in today's computer world, "logging" On and Off required a signature carrying with it responsibility for documenting everything heard or sent on the watch frequency. Even "atmospherics" were logged, as Xs.

We tend to forget also, that, in the mid nineteen thirties, pre WW2, very few amateurs had a decent workshop and fewer still had test equipment. Torch globes often served as indicators of current flow, RF output and as fuses. Milliamp meters could be borrowed from the Institute Library in Melbourne. Temperature controlled soldering and resin cored solder had not been invented and soldering was often done in the family kitchen with a plumber's iron heated on a gas ring, using flux that looked like Marmite.

It is also easy to forget that in the early 1940s reliable voice capable ground to air equipment was not in military service. Decent airborne voice equipment was first heard in the RAAF when Kittyhawks and Dakotas arrived with Command and liaison sets.

In 1941 Wirraways tasked to defend Darwin, used a battery operated TRF Receiver with plug in coils.
The self- excited 2 stage transmitter required lead acid batteries for its filament supply.

Between his other in-flight duties, the wireless air observer often had to cope with decoding incoming morse messages, on his lap, using a mechanical Syko machine. Instructions for the pilot were passed by a tap on his shoulder preceding the passing of a scribbled note. Aircrew of that era were ordinary young fellows required to do an extraordinary job.

In war, those lucky to be in the right place at the right time, generally survived and sometimes scored a medal. In the wrong place at the wrong time and it was highly likely that your name would appear on an honour roll.

The Roll is an attempt to do justice to those young amateur radio operators who were executed, murdered, shot down or mistreated when POW's.

So when the RD contests opens, at 1800 EAST, and when it closes tomorrow evening, please remember these "Old Men" of the Australian Amateur Radio Service.

Please join me now in silent contemplation of the way in which these radio amateurs conducted themselves in the war supposed to end all wars, but didn't.

"Sgt J.A. Burrage 459 Sqdn (VK3UW).

## ROLL CALL of Australian Amateurs who became "Silent Keys" as a result of contact with the enemy during WW2

Died during a flying battle over Sumatra".

"Fl Lt J.E. Goddard (VK6JG) 582 Sqdn RAF over France after a flying battle".

"Radio Officer N. Gunter (VK3NG). Killed when the SS "Kowarra" was torpedoed off Sandy Cape Q. with the loss of 35 lives".

"Cpl V.J. Jarvis (VK2VJ) 3 Squadron RAAF, Died in a Middle East ground battle".

"Gunner S.W Jones (VK3SF) Killed in action, Dutch New Guinea

"Lieutenant D. A Laws (VK4DR) "M" " Special unit, murdered by pro-Japanese natives near Saidor New Guinea ".

"Leading Teleg. J.E. Mann (VK3IE) one of 137 crew members of HMAS "Parramatta" who died when the ship was torpedoed in the Mediterranean ".

"Sgt J. McCandlish (VK3HN) 'M' Special Unit, Dutch New Guinea. Executed by the Japanese "

"F/ Lt P.P. Paterson (VK6PP) 24 Sqdn RAAF. Died after a flying battle near Rabaul".

"Telegraphist A.H. Rippon (VK6GR) Presumed Killed In Action when all aboard HMAS "Sydney" were lost".

"J.E. Snaddon (VK3VE) 459 Squadron RAAF. Died after a flying battle over the Mediterranean".

"Radio Officer R. P. Veal (VK3PV). Killed when MV "Neptunia" was bombed and sunk in Darwin Harbour".

"F/0 BR James (VK5BL) 76 Sqdn RAF. Died during a Halifax raid on Magdeburgh Germany".

"Signaller C.D. Roberts (VK2JV) Died while a POW working on the Thai-Burma railway".

**"Lest We Forget".**

# The fate of David Laws VK4DR, "W Special Force WW2

**Col. Harvey VK1AU ©**

David Laws (VK4DR) was 30 years old in August 1940 when appointed to the New Guinea Service of the Dept of External Territories. At the time of the Japanese attack on Rabaul David was the Administration's Radio Superintendent. Also an Army Reservist, he was Lieutenant in charge of a platoon away from Rabaul when a decision was made to evacuate as many as possible by ship. Word of this did not reach Lieut. Laws and his platoon was left behind. Rations and a Teleradio were available to them. The group salvaged a boat hull and a truck engine from a plantation and within a month were able to set-off for Buna on the coast of Papua, only to arrive 200 miles further away near Sio. Supplies were airdropped to the party who subsequently walked into Bena Bena, and were then flown to Port Moresby.

After home leave to recover from this ordeal Laws returned to New Guinea to join a party of five who were to relieve a Coastwatch team operating near Saidor on the Papua coast between Madang and Finschafen. Law's role was to walk-in with the team, put the Coastwatcher's Teleradios in order and return with the relieved party. A graphic description of their 14 day slog over steep slopes and along rudimentary tracks can be found in Erie Felt's book "The Coast Watchers".

Three weeks after Saidor became a "M" Special force outpost it became a Japanese staging post for barge traffic between Madang and Lae- Salarnaua. The Japanese presence affected the native population; some openly assisting the Japanese by helping raid Coastwatch supply hideouts. Lieut. Laws, with Naval Lieut. Bell and a civilian left on the return journey to Bena Bena on 2 May 1943.

A casualty report in the Melbourne Archives Office says that "(Lieut. Laws) reported 19 August 1943 then missing 78 days". Murphy's Law ensured that Army Records Office staff read this as Laws reporting back to his unit on 19 August after having been missing 78 days! In fact since 5 May he had been in a bush grave near Sibog Village. When the grave was uncovered none of the three occupants were wearing "dog tags" but all wore Australian army boots. One was short and fair, another dark and bearded. The bearded dark man was well known in the Madang area and was readily identified as Lieut. Bell. The short and fair man was said to be a stranger who did not speak "pidgin".

**As a Special Entry officer, David Law was not medically examined so his physical characteristics do not appear on his Army AAF D I record. Reliance had to be placed on circumstantial evidence as to who the "short fair man" might have been.**

As a Special Entry officer, David Law was not medically examined so his physical characteristics do not appear on his Army AAF D I record. Reliance had to be placed on circumstantial evidence as to who the "short fair man" might have been. Much signalling and correspondence flowed before it was accepted that Lieut. Laws' casualty status should be varied from "Missing" to "Missing believed killed".

Given the nature of "M"' Special force operations "behind enemy lines", the location of the grave was suppressed even from Army LHQ. However, there is a report on an AWM File signed by the then ANGAU Legal Officer (Capt.

*Continued on page 46*

# A WW2 Casualty, VK3NG Norman Gunter

Col. Harvey VK1AU ©

The List of names read on-air each year before the start of the RD Contest includes Norman Gunter VK3NG son of the late Arthur and Cora Gunter. Here is part of Norman's life story.

Norman was instrumental in introducing me, then a 12 year old, to the world of wireless and to a career in radio. He was a First Class Commercial operator who built his own Amateur station equipment. It was at Norman's desk in 1932 that I first saw the hypnotic blue glow from mercury rectifiers and the magic of a torch globe brightly lit without benefit of an installed battery. It became my passion then to try and emulate his skills. Norman was 23 years old when he first went to sea as Wireless Officer aboard the SS "Kowarra". Seven years later he was to lose his life during his sixth tour of duty on that vessel. Pre-war he served aboard the "Koolinga" and "Lanena" and after WW2 broke out, aboard the "Fiona"; "Cardross"; "Mamoo"; "Nairana" and "Koonda".

In 1942 Norman signed on again aboard the "Kowarra" a single screw steamer of 2125 tons built in 1916. The vessel was owned by the Australian Steamship Company and managed by Howard Smith. Norman was on-watch at sunset 24 April 1943 when the ship was torpedoed by a Japanese " I" Class submarine, while en-route independently from Townsville via Bowen to Brisbane with a cargo of sugar. At 1835 Z while steaming at full speed of 8.5 kts near Sandy Cape Q. the crew felt a heavy thud below water on the starboard side between holds three and four. By the time the third Officer got on deck, "Kowarra" had listed to starboard and the main mast had fallen out of the ship, carrying away the wireless aerial.

By the time Engineer Mr. Clark reached number three hatch, the foredeck was under water. Just as he reached the boat-deck the ship's back broke and the bow rose to such an extent that the covers and beams fell out of numbers one and two hatches, smashing the bridge and wireless room. The boilers blew up and Mr Clark was thrown into the sea as the vessel sank by the stem about 45 seconds after the torpedo struck.

The Chief Officer (Mr G. Harley aged 50) who was on the bridge when the torpedo struck, started signalling with an Aldis lamp towards Sandy Cape lighthouse. He was last seen on the bridge still signalling as "Kowarra" sank. Unfortunately his frantic signalling was not seen by lighthouse staff.

Chief Officer Harley was eventually awarded a posthumous British Civil Commendation for this brave conduct, which cost him his life.

Of "Kowarra's" seven Officers and 24 men only two officers and nine men were rescued and then only through a fortuitous sighting by an U. S Navy ship 12 hours after the attack.

A U.S.N. vessel engaged in convoy escort was ordered to proceed to a ship at the tail end of the convoy. It was seen to be making for the wrong vessel, but when the Convoy Commander tried by signal lamp to correct it's heading, his signal lamp failed. The Commander was then puzzled to see his detached ship circling about 2 1/2 miles away off the port quarter of the convoy. At 0730 K he received a message saying that two survivors had been picked up. Then at 0820K there was a request for an aircraft to be sent to search for other survivors, saying that by then (13 hours after the sinking) only 11 of "Kowarra's" crew of 31 had been rescued.

The convoy commander (Lt. Sweet, USN) tried unsuccessfully for four hours to contact a shore station on 500; 4235; 8470 and 425 kcs. Finally at 1425 K he asked the merchant ship "Kurimba" to try and make contact. An hour later "Kurmiba" reported that the request for air search had been passed to Rockhampton on 500 kcs. Thus the request for air search did not reach shore until 21 hours after "Kowarra" sank. The first air search (by an Anson) *did* not start until *dawn* 26 April, 36 hours after the sinking. Had it not been for wireless communication failure (still unexplained) some of the missing crew might have been rescued, including a probably injured VK3NG.

A note on file shows that at the time survivors were picked up, the convoy was about 180 miles from Brisbane and 150 miles from Rockhampton, normally an easy daylight path for most of the frequencies tried.

The answer to what went wrong with ship to shore communications is on Navy file 2037/2/1462, which I have been unable to find in Archives.

## Vale, Norman Gunter VK3NG

## The fate of David Laws VK4DR

*Continued from page 45*

Selby) that reveals the truth of the matter. A party comprising Lieuts Bell and Laws, a half-caste named Otto Schultz and a native boy from Rabaul were to walk out across the Finnister Ranges to Bena Bena, a 14 day journey. Starting from a Coastwatch camp on a tributary of the Nankina River below Waibol, several days into the journey near that village, the party were attacked by natives with axes and murdered, their belongings being taken to the Japanese.

Justice appeared to have been done when five natives (three from Waibot Village) were sentenced to death for the murders. Another native was sentenced to 5 years imprisonment for instigating the crime. However on 13 October 1944 all sentences were commuted to five years with hard labour.

The ANGAU file covering the period July - October 1944 which would contain the reasons for a recommendation for clemency going to the Major General commanding New Guinea Force, cannot be found.

Lieut. Laws, VK4DR, the Radio Technician who attended to Coastwatch communication needs and understood their difficulties, was never replaced.

His remains were transferred from Sibog to Madang War Cemetery, then to Lae War Cemetery where they now lie under the inscription "His Countries Friend".

Vale David, VK4DR.

## Amateurs who died while in the Services in the 1939 1945 World War

VK3DQ Morris J.D. VX16925 T/Maj AAMC 212 CCS. D 24/6144 at sea SWPA Accident

VK5BW Phillips J.G. BEMSX 2395 Cpl died 1/1/43 Army vehicle accident, Australia

VK6KS Anderson K.S. S/Sgt. Sigs Training Battalion. D 5/3/41 accidental drowning

VK2BQ Easton F.W. 429240 F/0 100 Sqdn. RAAF. D 5/3/44 when Beaufort A9-480 crashed shortly after taking off from Vivigani strip

VK2YK Abbott R.E 264204 (A)/F/Lt R.E. Abbott. D 16/11/43. A/c accident near Springshure, Qld.

VK2AJB Curle G.C 207732 Sgt 3 Sqdn D 17/3/41 in the Middle East as a result of a ground accident

VK3GO Stephens T. 418036 F/0 518 Sqdn RAF D 16/8/44. Died as a result of an accident in Scotland

VK30R Orr M.D 1700 F/0. AFHQ. D 29/7/41 at Kerang, due illness

VK3PI, Colthrup J.F 3485 F/0. 3 W.A.G. School. D 21/2/42 when Tiger Moth AI 7-19 crashed at Maryborough aerodrome Qld.

VK4FS Starr F.J 5085 AC 1. 23 Sqdn RAAF. D 12/8/40 in a flying accident off the Queensland Coast

VK4PR Allen R 404945 P/0 13 Squadron RAAF. D 1/1/42 when following engine failure, Hudson A16-29 dived into the sea off the Molucca Islands. 3 of the 4 crew members were killed

VK5AF Ives C.A. 300407 F/Sgt. Melbourne W/T Station. Died Ascot Vale 6/7/42 due illness.

# The RD Contest, when and why did it start?

Neil Penfold VK6NE.

**Those who were around when the first RD Contest occurred are now 54 years older. That means there are many who have no idea of the when and why. So let the following enlighten you.**

Although the inaugural contest was held in1948, the idea was born in 1947 in a motion brought before the Federal Council by the Queensland delegate attending the annual Federal Convention held in Melbourne. In the following year rules were drawn up by Bill Mitchell, VK3UM. A trophy was designed and subsequently manufactured by George Glover, VK3AG, and the perpetual date of the weekend nearest to the 15th August set aside as the period for the contest each year, representing the weekend nearest to "VJ" day, the day WWII ended.

Because the contest was decreed in memory of the licensed amateurs who gave their lives in defence of their country, it was aptly named the Remembrance Day Contest and the callsigns of those who died that we may live are permanently engraved upon the perpetual trophy which bears the name of the contest. The trophy itself is held by the division winning the contest each year.

That was written by Pierce Healy VK2APQ in October 1972, in Electronics Australia.

The trophy was in Darwin when cyclone Tracy struck and it suffered damage. It needed considerable repair and this was done in Adelaide principally by Ian Hunt VK5QX. The whole trophy was really transformed into "as good as new" condition with gold plating of the metal parts, the plinth refurbished and a second plinth added so that in future years, there would be space to add each year`s winning division`s medallion to the trophy.

It is possibly the most enduring and irreplaceable piece of WIA property.

I invite any member to write to AR describing the intense competition that took place between the Divisions of some years ago now. Yet then during the contest one would hear contestants stop occasionally to say "hello" to another operator that they had not heard since the last contest, asking how each other was, then plunging back into the contest. It was all fair and friendly, all Divisions and operators seemed to enjoy the contest and perhaps it drew the amateur fraternity a little closer together.

# Operation from Bomana War Cemetry

## International Papua New Guinea – P29KFS Rick Warnet

**Rick P29KFS brought a major enhancement to our Remembrance Day activities this year, in brief an operation from the Bomana War Cemetery with a field station on as many HF bands as possible.**

The connections for many old timers in Aussie with PNG go back to WW2 and many of their mates still reside here – in the cemetery.

The callsign used was P29AIF in honour of the Australian Infantry Force. They were set up for the RD in a small building about 100 m inside the main entry gate to the left of the road. This has mains power and a convenient verandah, table and operating area. Nearby is a large tree with branches suitable to support the three dipoles for 40, 20 and 15 m and the intermediate support point for the multiband LW that terminated nearer to a tall coconut tree. The other ends of the dipoles were supported by a PNG made telomast, clamped to one of the vehicles parked a suitable distance from the tree. Planned frequencies were all P29 oriented, 1829, 3629, 7069 / 7129, 14129, 21229, 28290 with any CW ops just 29 kHz above the band edge. (Clever Rick... 29!) A BBQ fed the troops.

# Ham Shack Computers

**Alan Gibbs, VK6PG**
223 Crimea Street, NORANDA WA 6062
Email: vk6pg@tpg.com.au

## Part 29 –

# Files and Data Backups

## Checking Software

Assume you've recently bought a new, or acquired a second-hand computer. It came with "all the software" and seems to work quite well. Make a detailed list of the software that came in the package. Start with the operating system, then each program package one by one. The majority of modern packages are on CD-ROMs and very easy to catalogue.

Some of the disks might be supplied in paper envelopes and vulnerable to damage, some are not even labeled and difficult to find out what it actually does! Some new computer vendors might supply the disks, but the serial numbers of the software on the computer are different to that shown on the disks! The reasons are that the supplier loads the software from a file server being quicker for them to do rather than from individual CD-ROMs. So make sure you have EVERY software package you are entitled to and the serial numbers match correctly. For disks supplied in paper envelopes, purchase a quantity of Crystal CD cases, write down the identifying information and slide into the new case. Folding a narrow strip along the label can easily make a side-edge of paper. Remove the inner part of the case, insert the paper label and then clip the case back together. Now you'll be able to stack the CD's and see the titles rather than fumbling around like a pack of cards.

Old 1.2Mb floppy disk boxes are a handy means of storing CD's – that's if you can find them these days!

Handbooks are now a thing of the past. So-called "on-line" help files are part of, and written to, the supplied CD-ROMs leaving no option but to plug-in and surf around for answers to common questions.

Smaller programs like device drivers might be supplied on 1.44-Mb floppy disks. Make sure these disks are write-protected, and store them inside small floppy crystal cases available from 'Two Dollar Shops' in packs of five, and make paper labels to fit inside the boxes.

## Software Backups

Backing up floppies is easy. 'Click' on My Computer, point to the 1.44Mb Drive A: then 'click' Copy Disk... and follow the instructions on the screen. The once common floppy disk is fast moving into the realm of obsolescence and backing up files and programs too large to fit on floppies has to be done using one of the following options:

- Removable Media like Zip or Jazz drives capable of storing 100Mb, 250Mb and up to 1Gb of data. These have become obsolete due to the high cost of disks. Each disk retails for upwards of $25 for a single 100Mb disk and about $180 for the Zip Drive to do all the work! At about $2.50/Mb upwards - NOT an option today.
- High-Density Tape backup systems used to be common place for copying whole computer systems. However, tape systems are long obsolete, unreliable, slow in operation, and extremely expensive to set up and maintain.
- USB Keys now come in a variety of sizes and shapes. About the size of a car key fob, these little 'keys' plug directly into a spare USB (Universal Serial Bus) socket. Storage sizes vary from 16Mb upwards depending upon the depth of one's pocket. They are ideal for portable use and primarily intended for business users rather than serious hobbyists. Nice to use and quite a gimmick for those who can afford them. Fine as a passing interest but the high cost-per-megabyte equation is not realistic for Ham Shack Computer use.
- Adding a Secondary IDE Hard Drive is a fine choice. The cost-per-megabyte is very low, and the added drive offers random access at high speed. Drives around 40-80Gb are cheap to buy ($130-$150), can be divided into discrete partitions, reliable, faster than floppies, Zip Disks, USB Disks, and leaves tape drives groveling around way back in the dust!

Hard drives are very simple to install and can provide the perfect back-up solution for the whole of your primary Hard Drive C:\ using Norton Ghost as a mirror. Readers wise enough to have purchased Norton SystemWorks, complete with Norton AntiVirus 2003, would already have the backing-up software ready to roll at no extra financial outlay. All round, a fine choice for wise readers following this series. Another advantage of adding an extra hard drive being that if C:\drive fails – swap drives and you're operational again.

It's cheaper just to add a replacement drive and everything is back to square one. For readers who think this is not an option, then wait until the one hard drive fails – then EVERYTHING has been lost in one go! All the software and documents must be replaced to a new hard drive which can take days to do (if at all).

- CD-R/W (Read and Write) Drives (3) offer perhaps the best dollar-for-dollar backup solutions these days. Modern computers already have CD-ROM (Read Only) drives installed as standard. Without CD-ROMs it would be impossible to install programs, look at photo images or play music CDs. Therefore it makes good sense to add a CD-R/W drive to the combo. Blank CD Read /Write disks are especially cheap to buy and capable of storing 700Mb of data for about $2 each. They are even cheaper if purchased in packs of five, ten or more including crystal cases. But for just $2 you effectively have

700Mb of storage on a drive that can be used like a floppy. Very cost effective because files can be deleted, added to, defragmented etc.

- CD-R (Read Only) means that you can write data once only – then read back. In other words once only record but you can read them as many times as you like. At about 50-cents each including narrow crystal cases, or cheaper if bought as 'spindles' of about 25 or 50 disks in one go, but you'll need to also buy the crystal cases for later storage and protection. Unlike the CD-R/W disks, they cannot be overwritten, but files can be added until the disk is full. However, at such a low price, backing up programs and files is easy, once updated backups follow, throw away the old and replace with the new and swap the cases!
- CD Notes and Tips but first a few words about cases. There are two types of cases, the standard crystal case and thinner versions called the compact case. Making and fitting labels inside the standard case is easy with Nero CD Burning Software (2). Readers lucky to own colour printers will be delighted by the professional results, and the ability to write title information on the wide edge – easy for library stacking CDs with the standard case. But the thinner compact is more difficult to label except for the flat face and lacking a wide edge. Slim cases take less storage room and are nice to use. If you end up with a pile they are difficult to sort through because each disk has to be pulled from the pile to see the front face. It's all about personal choice and cost.
- Nero Software is a dream to use with options to copy data and/or music CDs. Whole directories, individual files, pictures, music and computer programs can be preselected from the dual directory display just like the old Norton Commander days. Drag and Drop files one-by-one during the selection process. Nero saves the "image" with the help of a disk usage strip showing how the proposed storage is filling the newly inserted CD-R disk. The "burning options" can be modified, reviewed, added to, and subtracted from - until personal satisfaction is attained. If all is well, 'click' the 'BURN CD" and let Nero finish the job for you. Nero also offers label wizards and the design tools for you to produce professional looking labels for the sides and front/back of standard and slim crystal cases, and round annulus shaped labels used as "stickers" to the top sides of CDs.
- Planning Backups should be done seriously otherwise you'll end up with a huge box of CDs that is difficult to sort through in an emergency. Most users will save their files in a sub-directory of My Documents. This whole directory as well as the sub-directories can be dragged and burnt onto a CD-R/W disk each week. If downloaded files and programs are regularly grabbed off the Internet, these can be placed to another CD-R/W CD called "downloads" or whatever. Files from popular magazine CDs can be added to other CD-R's called "Programs" and so on. Within a few weeks, you'll end up with specific CDs for specific functions used in your own environment. If they are nicely labelled and stacked – that's good news. Coloured cases could be used for specific jobs like – RED operating systems, GREEN documents, BLUE for programs, ORANGE for photographs etc.

## Summary

This edition lightly covers the problem of backing up computer stuff just in case misfortune should strike. Don't leave backup disks where they can be mislaid, eaten by the dog or pinched by the grand kids. A locked, metal filling cabinet is ideal, and in the case of mission critical situations, in another building in case of fire etc. Businesses already do this anyway just in case their computers get stolen!

Setting up a high-density backup system for less than $100 including spare CDs is an offer too good to refuse, AND all those grubby floppy disks can now be relegated to the bin. Remember that about 600, 1.44Mb floppy's can be saved to ONE CD-R for a cost of around 50 cents (the cost of posting one letter anywhere in Australia)! Really folks – do you have a choice, or are you one that can't be bothered? Well if you don't bother about backing things up, try reading issues 10, 12, 13, 16, and 24 of Ham Shack Computers once more. Imagine losing your entire electronic logbook with over 20 years of entries, DXCC, awards records...and more thanks to just one mains power surge – Yuk!

Remember – Slim cased CD-ROM's with all published Ham Shack Computers articles, including copies of the featured software described in the series are available from the writer at $10 including packing, postage anywhere in Australia or New Zealand. CWO only by post with enclosed $10 for each disk required please.

**Ham Tip No. 29.** Coloured Dymotape™ is great for slim case edge labels.

Ham Shack Computers, Part 30 – 'Programming the Icom ICQ7A/E' If you've ever tried to do this by hand, now try it the easy way instead.

## References:


(1) Ham Shack Computers Web:
http://www2.tpg.com.au/users/vk6pg
(2) Nero CD Burning Software at:
http://www.nero.com
(3) 52x24x52x CD-R/W drives at:
http://www.liteonit.com


**73's de Alan, VK6PG**

**- ar**

# Silent Key

## Ted Beard VK7EB

It is with regret that we announce the passing of Ted Beard VK7EB.

Ted was born in 1924. He became a silent key on 26 July 2003.

Ted served in the Royal Australian Navy during World War Two and became an amateur radio operator in 1959 as VK7ZAU. A couple of year later he became VK7EB. Ted was always willing to contribute to amateur radio and the Institute and was Divisional Secretary from 1990 to 1994. Our condolences to Ted's wife and daughter and close friends.

Vale Ted.

**Justin Giles-Clark VK7TW**

# Club News

## North East Radio Club

The August meeting of the North East Radio Club was held on Friday 8th. It was attended by about 30 club members. The meeting commenced with business, followed by light refreshments. The speaker for the night was Keith VK5OQ who discussed Fox Hunting techniques and equipment. He demonstrated the HB9CV antenna and a highly effective receiver. There is renewed interest in fox hunting of late. The club intends to follow up with some practical activities using this mode. It is also a means of encouraging new members into the ranks.

The weekend of the 9th and 10th of August was the Rally of SA. The NERC club along with several other clubs, individuals and friends provided voice and packet communications for the Rally. Twenty four stages over the 2 days meant involvement of over 60 people. The weather was cold but not too wet, until the last stages on Sunday. Thanks to all the people who gave up their time to help, but also gained experience in portable operation.

Club members were successful in the last examination, with David Fisk being the latest to get his new call sign, VK5HJC. Others passed in some of the subjects. Congratulations to all. The club will run its next exam on Sunday September 21st. All enquiries to Peter Watts VK5ZFW.

NERC meetings are held on the Second Friday of each month at the Ardtornish Primary School, Saarinen Ave St Agnes. The club is starting a construction night on the 4th Friday of each month. August 29th will be the first, it is planned to modify computer power supplies to provide 13.5V at 20 amps. Brian VK5VI will lead this night. A small charge will be made for parts.

73s David Clegg Hon Secretary. vk5amk@chariot.net.au

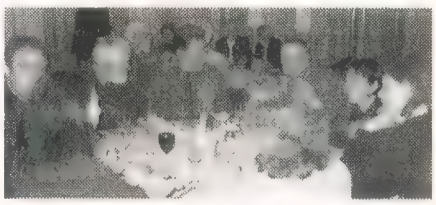
## Adelaide Hills Amateur Radio Society

This month we can only report that our Mid-year Dinner was a great success. Despite a number of members being on the road heading North there was a good roll-up. Approximately 60 people enjoyed good fellowship and a good meal.

There is some publicity for the club in one of the local newspapers, "The Hills Courier", the article was prepared by Rob VK5RG. Hopefully there will be some inquiries about amateur radio and about our club, as a consequence, but only time will tell.

Thank to Dave VK5NU for the photo(s).

A good program of lectures has been planned for the rest of the year. Anyone visiting Adelaide is welcome to come to a meeting on the third Thursday of each month at 730 SAST at Seymour Road Blackwood.



## Bass Amateur Radio IRLP Group Inc

**Nicholas Brasch – author of *Communication in Australia through Radio and Television*, will be making a guest appearance on VK3IRL (date to be advised) discussing his book.**

There are 5 books to be given away during the broadcast and all you have to do to be in the running of one of these signed copies is to put your Name, Address and Call Sign on the back of an envelope and mail it to BOOK GIVEAWAY, VK3IRL, P.O. Box 368, Rosebud, Victoria, Australia, 3939.

For more information contact Graham VK3JBO.
Phone/Fax: 61 3 5982 0315
http://www.barirlpg.cjb.net www.qsl.net/vk3irl

## Wagga Amateur Radio Club

Wagga Amateur Radio Club are again the hosts for the Riverina Field Day. This is one of the longest running Field Days on the Amateur Radio Calendar and alternates between the Twin Cities club in Albury Wodonga and Wagga.

The date has been changed to hopefully attract some better weather and this year it is being held on the Labor Day long weekend in NSW. October 4 & 5.

Saturday will be quite busy with the NSW WIA Council meeting in Wagga Wagga for the first time during the Saturday afternoon. That will be followed by a smorgasbord dinner at the clubrooms for the modest price of $20.00 and catered by the Wagga Commercial Club. The cut off date for dinner numbers is Monday 29 September.

On Sunday, doors open for the public at 9am and along with free cups of coffee and tea you will find a good array of pre loved and new equipment along with the NSW WIA Bookshop. Seminars running during the morning include a talk on Weak Signal communications. If there is enough interest some foxhunts will be organised.

The club is looking forward to hosting this event as well as welcoming old and new faces from around south eastern Australia.

For more information or to book tables and dinner ring John VK2YW on 0269265471 or e-mail to vk2yw@wia.org.au

## Contest Calendar September - November, 2003

| | | | | |
|---|---|---|---|---|
| Sep | 6/7 | Worked All Europe DX Contest | (SSB) | |
| Sep | 13/14 | PNG Independence Day Scramble | (SSB) | (Sep 03) |
| Sep | 27/28 | CQ/RJ WW RTTY DX Contest | | |
| Oct | 4/5 | Oceania DX Contest | (SSB) | (Sep 03) |
| Oct | 5 | RSGB 21/28 MHZ Contest | (SSB) | |
| Oct | 11/12 | Oceania DX Contest | (CW) | (Sep 03) |
| Oct | 18/19 | JARTS WW RTTY Contests | | |
| Oct | 18/19 | Worked ALI Germany Contest | (CW/SSB) | |
| Oct | 19 | RSGB 21/28 MHz Contest | (CW) | |
| Oct | 25/26 | CQ WW DX Contest | (SSB) | |
| Oct | 25/26 | CQ WW SWL Challenge | | |
| Nov | 3 | High Speed Club Contests ( | CW) | |
| Nov | 2/3 | Ukrainian Contest | (CW/SSWB/RTTY) | |
| Nov | 9/10 | OK/OM DX Contest | (CW) | |
| Nov | 16/17 | LZ DX COntest | (CW) | |
| Nov | 23/24 | CQ WW DX Contest | (CW) | |
| Nov | 23/24 | CQ WW SWL Challenge | (CW) | |

## Results CQ/RJ WPX RTTY Contest 2003

(VKs only Call\score)
Single Operator, All Bands, High Power
VK5GN 178,366
VK6GOM 148,410
Single Operator, All Bands, Low power
VK3DBQ 88.804
VK2CZ 3,424

## A Cry For Help!!!!

It must be obvious to all readers that these notes are not being properly maintained. This is because they need a loving carer.

Could you help?? We need someone to compile the monthly notes, contest results and organise rules for publication. Please, if you can help have a word with the AR Editor, Col. Low, at edarmag@chariot.net.au or Ian Godsil on phone 0408123557.

## 2003 Oceania DX Contest Rules

**From Brian Miller ZL1AZZE Contest Manager**

### Special Notes:

- Single-Op Single Band logs are to record ALL contacts made by the station - both on the band chosen for the entry and on any other bands. (2002 rule change)
- Further information on the contest is available from the Oceania DX Contest web site at 7/25/03.

THE AIM: To promote HF contacts with stations in the Oceania region (VK, ZL, Pacific Islands and other locations within the IARU "Worked All Continents" Oceania boundary).

### Contest Periods:

**PHONE Contest:** 0800 UTC Saturday 4 October to 0800 UTC Sunday 5 October

**CW Contest:** 0800 UTC Saturday 11 October to 0800 UTC Sunday 12 October

**Bands:** 160 m - 10 m (no WARC bands).

### Entry Categories:

| | |
|---|---|
| **Single-Op** | Single Operator, All Bands or Single Band. |
| **Multi-One** | Multiple Operator, Single Transmitter, All Bands. |
| **Multi-Multi** | Multiple Operator, Multiple Transmitter, All Bands. |
| **SWL** | Short Wave Listener (Receive Only) All Bands. |

### Exchange:

RS(T) report plus a three or four digit number starting at 001 and incrementing by one for each contact. Multi-One entries are to use a separate serial number for the Multiplier station. Multi-Multi entries are to use a separate serial number for each band.

### Multiplier:

The number of different prefixes worked. The same prefix may be counted once on each band for multiplier credit. A prefix is the letter/numeral combination that forms the first

part of the amateur call.

### Contact Points:

All entries score twenty points per contact on 160 m; ten points on 80 m; five points on 40 m; one point on 20 m; two points on 15 m; and three points on 10 m. The same station may only be counted once on each band for contact points credit.

### Final Score:

The sum of the contact points from all bands multiplied by the multiplier.

### Electronic Logs:

These are preferred, especially for logs containing more than 50 contacts. These should, where possible, be submitted in the Cabrillo format. The Cabrillo log file must include both an accurately completed header (containing the summary information) and the QSO log data. All of the fields in the Cabrillo header must be completed except for the ARRL Section, Power, Category Overlay and Soapbox lines. See the Oceania DX Contest web site for information about the Cabrillo format requirements.

If you cannot submit a Cabrillo log, then you may submit the plain ASCII text output from most of the popular logging software such as TR, CT, NA, Writelog etc. All non-Cabrillo logs must be accompanied by a separate summary file in plain ASCII text - see the requirements for paper log summary sheets below. All electronic log files must be in plain ASCII text. Log information in columns is to be separated by character spaces - do not use Tabs or other formatting characters for this purpose.

File names are to include the call sign used during the contest and an appropriate file extension - e.g., ZL2WB submits a Cabrillo file - it should be named ZL2WB.LOG.

The files are to be submitted as an e-mail attachment or posted on a 3.5" diskette. Only one entry is to be included in each submission. Files sent via e-mail must be sent as attachments, not as the text of the e-mail. Send the files to phoctest@oceaniadxcontest.com (for phone entries) or cwoctest@oceaniadxcontest.com (for CW entries). Do not zip files. The E-mail message subject line must include the entry's call sign, Mode (CW or PHONE), entry category and the word "OCEANIA" in the Subject line.

Diskettes are to be posted to: Oceania DX Contest, c/o Wellington Amateur Radio Club Inc., PO Box 6464, Wellington 6030, New Zealand with the entry's call sign, Mode (CW or PHONE), entry category and the word "OCEANIA" clearly marked on the front of the package. Diskettes are not returnable.

If an electronic log is not possible then paper logs in the following format are acceptable. Include additional columns showing the contact points and new multiplier prefixes claimed against individual contacts. Show multiplier prefixes for the first time that they are worked on each band. Duplicate contacts must be clearly shown - Do not delete duplicate contacts. Each paper log is to be accompanied by an alpha/numeric checklist of claimed multiplier prefixes worked on each band plus a summary sheet.

Official log sheets and summary are available at the contest website or by sending a SASE to the address below with sufficient postage. If official forms are not available then you may make your own in accordance with the general requirements outlined above. Post logs to the above address. Only one entry is to be included in each submission.

**Deadline** - All logs must be emailed or postmarked NO LATER than 16 November 2003. A list of logs received will be posted on the contest website.

### Awards (ZL)

Top entrant from Oceania in Single Operator All Band Phone category - Ron Wills, ZL2TT Memorial trophy sponsored by ZL2GI, ZL2AL, Wellington Amateur Radio Club and NZART.

Additional awards are available for Australia, Asia, North America and others may also be applied at the discretion of the Contest Committee.

**Brian Miller ZL1AZE**
for Oceania DX Contest Committee

# The PNG Independence Day Scramble

*13/14 September 2003*
*Saturday 00:00Z to Monday 00:00Z*

### I. Period of Operation: 4x2 hours sessions

Stations may operate for 4x2 hour sessions. Off times must be a minimum 4 hours and clearly marked in the log. For example:

Sat 1400-1600 (20M), 2100-2300 (80M)
Sun 1000-1200 (15M), 1900-2100 (40M)

### II. Purpose: Promotion of PNG and Amateur Radio in PNG

To promote the awareness of Papua New Guinea as a nation and encourage friendly participation of amateur radio operators in PNG while improving SSB operating skills across the amateur radio bands.

### III. Objective:

The object of the contest is for PNG amateurs to contact as many other amateurs in different countries and DX zones (1-40) around the world during the contest period.

### IV. Bands of Operation: The 3.5, 7, 14, 21 and 28 MHz bands may be used.

Stations may use only the 3.5, 7, 14, 21 and 28 MHz bands. In order to minimize band disruption and to make it more convenient for stations who wish to participate the following frequencies in each of the bands will be used.

| | | |
|---|---|---|
| 80 metre | 3.560 -3.600 | |
| 40 metre | 7.050 -7.100 | |
| 20 metre | 14.175 - | 14.250 |
| 15 metre | 21.175 - | 21.250 |
| 10 metre | 28.450 - | 28.550 |

### V. Terms of Competition:

Only PNG Amateurs will be eligible for entry but stations contacted during the contest will have the opportunity to confirm PNG as a QSO contact or qualify for the PNGARS (Papua New Guinea Amateur Radio Society) Bird of Paradise

Award (details below). QSL cards will be specially printed to show the QTH's of the stations participating.

## VI. Rules:

Single Operator Only:

1. Stations will operate as a Single operator station at which one person performs all of the operating, logging and management of the station's equipment.
2. All entrants must operate within the privileges of their license. Transmitters and receivers must be located within a 500 metre diameter circle and all antennas must be physically connected by wires to the transmitters and receivers used by the entrant.
3. On-air periods must not exceed 2 hours and only 4 periods of transmission are permitted. Only one transmitted signal of a maximum power not exceeding 100 watts is allowed at any time.
4. Duplicate contacts of stations are permitted if the stations contacted have not been previously logged on the band in use. That is, each station must be logged only once on each band of operation.
5. If a station ceases to operate after commencing an on air period it will count as 1 of the 4 on air sessions permitted.
6. The contestant must work the same band for all of the 2 hour period.
7. Each contestant must work at least 3 separate bands during the contest. The fourth band of operation can be of the operator's choosing. It may be a band already worked or a band not worked from the list above.
8. The submitted log will be under the control operator's PNG callsign.
9. A second operator of a lower license class is permitted for a period of up to 2 hours during the contest. These periods can be broken into smaller blocks during any of the 4x2 hours sessions the operator chooses to compete. PNG second operator regulations will apply. This should give more experienced and qualified operators the opportunity to assist a younger or less experienced operator to participate in the contest and be elmered into amateur radio.

## VII. Exchange:

RS(T) report will consist of the usual reception and strength (5/9) as well as the DX zone number in which the station is located. For PNG the report will be 5928

## VIII. Contact Points:

Contacts between stations will be awarded points on the following basis as determined by the band of operation.

10 m = 2 points
15 m = 1 point
20 m = 1 point
40 m = 2 points
80 m = 4 points

The total points scored for contacts during the contest will be the sum of all points from the contacts on each of the bands operated.

## IX Multipliers:

The total number of zones and countries worked across all bands will act as independent multiplier values for the contestant's score.

ie Total score = Total contacts points x Total Zones x Total Countries

## IX. QSL Cards:

Stations may apply for QSL cards for bonafide contacts. A self addressed envelope and a suggested donation of US$2.00 for postage and handling of cards is requested. (No IRC's please. They don't have the same value here.) A card should be written for each station contacted for which a confirmation is required. The suggested donation will cover all contacts needing confirmation-ie: US$2.00 covers 1 or 10 QSL cards providing they are posted in the 1 envelope.

Cards requested through the bureau for the contest will be handled in the usual manner but it will be the responsibility of the operator to reply.

Contest related QSL requests for cards should be sent to:

P29KPH Peter
PO Box 384 UKARUMPA EHP 444
PAPUA NEW GUINEA

## X: Bird of Paradise Award:

The Bird of Paradise Award is conferred on Amateur Radio operators around the world who are able to provide evidence of confirmed contacts with 5 P29 operators in 3 separate provinces of PNG. A certificate acknowledging that the holder has met the requirements of the Bird of Paradise Award is sent to successful applicants. Stations meeting the Award requirements can apply for the certificate and relevant QSL cards after the contest. The processing of the award has a US$5.00 handling and postage fee. The contest provides the opportunity for stations worldwide to succeed in working enough P29 stations on the same weekend to qualify for the award.

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**St Augustine's Hall, Orr Street**
**Shepparton,**
**Victoria**
**Sunday 14 September**
**10 am – 2pm**

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## VK7 News

*Continued from page 33*

held all over the state complete with dapper stripped WIA blazers that were obligatory for these events! There was constant rivalry between the North and South and as one of the clubs became more active it would take over and the Divisional HQ would move between Hobart and Launceston.

1939 saw Col Wright, (now VK7LZ and still an active amateur) reconstruct the Northern zone and the minutes record a vote of thanks. This year also saw the start of WWII and the Division went into recess and was reactivated in October 1945 in Hobart with about 12 members. Sometime between 1947 and 51 the WIA in the NW becomes active. In 1951, VK7 won the RD contest. In 1958 the Division met in the club rooms in Liverpool St, Hobart and the antenna mast can still be seen today! In 1961, Grote Reber became a full member and the Division went into the radio construction business, building and supplying ambulance and fire brigade radios and accessories. The 60s saw the rise of VHF and foxhunts and field days were very popular.

The WIA assisted the ABC on several occasions. Above far left is Trevor Watkins, 7DX and far right, Lon Jensen, 7LJ from Devonport, aboard the Marine Board vessel, Toorah, to broadcast descriptions of the Hobart Regatta in 1929. 7ZL was the ABC station and 7HR the Hobart Radio Research Club Station callsign.

Many thanks to Richard for a very entertaining and illustrated talk demonstrating the Tasmanian Division's rich history. See the VK7 website at www.wia.org.au/vk7 for more historic pictures.

**73, Justin Giles-Clark, VK7TW**

# Silent Key

## Cec Bardwell

I note with regret in the June issue of AR that Cec Bardwell has become a Silent Key.

I was one on many hundreds (thousands?) of present day amateurs who were able to pass their theory test by using the correspondence course so ably provided by Cec and the NSW Division. And therin lies a tale.

I always had a bit of an interest in radio right from my school days, but never got past the crystal set and one valve radio stage.

In PNG in the early 60's, I was a young surveyor and, at that time, at the start of the satellite age, the Americans wanted to connect their islands in the North Pacific to Australia, staging through New Guinea in a fairly extensive geodetic survey using airborne radar ranging. This was to make tracking of their satellites more accurate. I was attached to a US Air Force Unit that was doing a reconnaisance for their many mountain top stations in PNG. Because of the electronic nature of the project, one of the party was a amateur, whose call I could never remember, but whose name was John Keith. John got me further interested in amateur radio, and told me about things such as HeathKits, which were a real boon for budding home constructors in those days.

At the conclusion of the attachment, I went on 3 months leave, and ended up in at my mother's house in Brisbane after a month, wondering what to do with the rest of my leave. So, I started to try to find where I could get some tuition on the theory of AR.

The Marconi School of Radio seemed to be a good bet. So, off I wrote. Got the usual letter back extolling the virtues of the Marconi School, all very good, and the fee level, all very bad. But, there was a postscript to say that the WIA, NSW Division, had a course that might more suit my interests in amateur radio. Well, it might be a lot less expensive so, with nothing to lose, off I wrote, and got a letter back giving me the information, fees etc, all of which were more at my level. So I started on that course.

It was not until some months later that, for some reason, I had both letters open, and the penny dropped. They were both signed C.E. Bardwell. He was of great assistance to me in getting my theory up to speed, and his written comments on my papers was of great benefit. I met him personally only once, when I was returning through Sydney after my honeymoon on the South Coast of NSW, part of which was spent doing the course papers. My wife still puts up with amateur radio.

He is a great loss to Amateur Radio.

**Brian Mennis VK4XS, formerly VK9BJ, P29BJ.**

**Bass Amateur Radio IRLP Group Inc**

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Bill Magnusson VK3JT

# PCsat may be Permanently QRT

**"We were hoping she would make it to the 17th – 31st July full sun period, but the last packet captured was 7 days prior, on about the 10th of July".**

Thus announced Bob Bruninga a few weeks ago. There was more than just a touch of sadness in Bob's announcement. PCsat was "his baby". It was conceived in the US Navy's Cadet College, built by Bob's students under his supervision. He continued, "Our other command stations report the same". "My guess is that one or more of the NICAD cell's finally shorted, reducing the voltage below our low-voltage cut-off circuit which was designed to protect one side from a failed battery on the other.... and in the end game, to shut it up for good". It seems that there is still a little life left in PCsat.

The last few days before writing this column reports have come in of stations connecting briefly and recording some telemetry. The writing is on the wall however. PCsat has been a successful experiment in "unproto" satellite digital communications. It was launched on September 30th 2001 making it almost 2 years old. It has been operating at less than potential for some time due to damaged solar cells at launch making power management difficult. Bob has another similar satellite undergoing tests at present. He posted the following information a few weeks ago. "PCsat2 prototype is on the air in Annapolis, Maryland (USA) and may be workable out to about 10 miles. We invite anyone in range to please experiment with its three transponders:

APRS/UI digipeater (145.825 up and down)

PSK-31 transponder (10m SSB up 435.250 down)

FM Voice repeater. (145.800 up 437.975 down)

See: http://web.usna.navy.mil/~bruninga/pcsat2.html for further information on PCsat2. Of course this was just a local experiment but it gives an indication of some of the services to be offered by PCsat2.

# More on the "S.C.R.A.P" software package

**In the June 2003 column I reviewed a brand-new satellite tracking program called "S.C.R.A.P".**

The author Bill AA6ED has posted an update on the AMSAT-BB giving details of new features included in the program as a result of feedback from users. Bill is obviously burning the midnight oil on this software and it could develop into something that will be embraced by many amateur radio satellite enthusiasts. Best of all - he is putting the program into the public domain - it's free! You can download a Power-point presentation of the software at:

http://www.rtty.com/bytheway/SCRAP

The program itself can be downloaded at:

http://www.rtty.com/bytheway/SCRAP/download

SCRAP is similar to Analytic Graphics STK, Aerospace SOAP, Predict and InstantTrac software, with the exception that it is truly Windows based, has been tested on Windows 95, 98 and 2000.

## The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an email mailing list for breaking news and such things as software releases. Members use the AMSAT-Australia HF net as a forum.

## AMSAT-Australia HF net

The net meets formally on the second Sunday evening of the month. In winter (end of March until the end of October) the net meets on 3.685 MHz at 1000 UTC with early check-ins at 0945UTC. In summer (end of October until end of March) the net meets on 7.068 MHz at 0900UTC with early check-ins at 0845UTC. All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,
9 Homer Rd,
Clarence Park, SA. 5034

Graham's email address is:
vk5agr@amsat.org

# DX Operation on AO-40

**With the sunspot cycle on the way down we can expect to see DX working on the HF bands become more and more difficult and unpredictable.**

At similar times in the past, AO-10 and AO-13 in their turn provided a platform for good DX operation at times of low sunspot activity. As a result a lot of HF folk joined the ranks of satellite operators. AO-40 is in a prime position to repeat this feat. The last month or two has seen an upsurge of DX working on AO-40 and many DXpeditions have been including AO-40 portable stations on their wanderings. Some very rare call areas have been activated. As an example Jim, K0SBH reported the following. "The 7P8NK DXpedition in Lesotho was active this past week on AO-40 CW and SSB. Starting Monday, 28 July 2003 they will be relocating to Swaziland as 3DA0WC. They expect to be operational from the new location for 4 days and will be operating AO-40". That announcement is enough to whet any DXer's appetite.

# Possible return of UO-22

**Chris Jackson has indicated that UO-22 may not be dead after all.**

He informed the BB that new software had been uploaded to the spacecraft and it was expected that it would respond - at least when not in eclipse. I haven't had a chance to check it out at the time of writing but we can live in hope of seeing this 'old faithful' return to service. It will be great to have at least one 9600 baud digital bird operating again.

*continued next page*

# Silent Key

## John Kerr Tutton VK3ZC

1914 – 2003

John, known as 'Jack' to his sisters, passed away at Cabrini Ashwood on 13 March 2003. He had been in ill health for some time following a stroke, a quadruple bypass and a motor accident. He was not able to go out unassisted.

John became an SWL in 1928 and obtained his AOCP on 24 May 1932 aged 18 years. He was a very keen CW operator, and an enthusiastic competitor in the Commonwealth Contest (BERU). He was also a great advocate for this contest, and persuaded many others to participate. He had never married, and amateur radio was one of the greatest pleasures in his life. Educated at Xavier College Melbourne, he was secretary of the Old Xaverians Amateur Athletics Club for 50 years. He was awarded a plaque by The International Union of Modern Pentathlon - Distinguished Service Award for 50 years service to the sport. On one occasion he broke a leg when pole vaulting. John's civilian career was devoted to the Sun Alliance Insurance Company.

John and his close amateur friend Jim Hunt VK3AZY of Cheltenham, with the assistance of the athletic association, once walked a 38 foot oregon aerial mast from Hawthorn to Camberwell. Jim has taken possession of this mast; he has also taken over John's old call sign of VK3ZC.

John, having been a member of the pre-war Militia, enlisted in the 2nd AIF, and joined the unit that became the 2/12 Field Regiment. He retired as a Major at the war's end. He was 'Mentioned in Dispatches' during his war service. He was a 'Tobruk Rat' and served at El Alamein , New Guinea and Borneo. John became President of the 2/12 Field Regiment Association, and was awarded Life Membership in 1988. He was a prominent figure, resplendent in uniform, leading his comrades down St Kilda Rd in the annual ANZAC Day march.

He became member number four of the Radio Amateurs Old Timers Club, and served as a committee member for many years. His knowledge of DX matters was very useful during his proof reading contribution in the production of Amateur Radio magazine.

John's sister Betty, who was a war widow, passed away only a fortnight later than her brother, so his surviving sister Margaret has had to cope with a double tragedy. Sympathy is extended to her. Margaret wishes to express thanks to all who gave John friendship over the years. John was one of nature's gentlemen, and will be greatly missed by all who knew him.

**Graham Thornton VK3IY**

**AMSAT continued**

# FEC - the Way to the Future of Amateur Satellite Telemetry

**Peter Guelzow DB2OS presented a paper on the use of Forward Error Correction (FEC) with AO-40 telemetry at the recent AMSAT-UK colloquium.**

He went out of his way to thank Phil Karn K9AQ for his persistence in "pushing" FEC as the right system to ensure better copy of the AO-40 telemetry under very adverse conditions. To quote Peter "It is one of the best things, for Amateur satellites, to be developed in the past 20 years. My congratulations to Phil, Peter and the whole implementation team that helped bring this about and another thank you to AMSAT VP of Operations Stacey Mills W4SM for modifying his telemetry program, so that we all may use the FEC operation. Ron VK5AKJ spoke very highly of the new system on the AMSAT-VK net last month. He was able to get perfect copy from the 400 baud PSK telemetry beacon on AO-40 with very simple antennas, even when squint angles were much less than optimal. Full details including Windows based software is available for download from the AMSAT-NA web site.

# ECHO takes shape

**Dr Tom Clark W3IWI gave the following details of a meeting held last month to review the progress of AMSAT-OSCAR-ECHO.**

"On August 5th, Dick(W4PUJ), Rick(W2GPS) and Tom(W3IWI) met with Mark(N4TPY), Dino(KC4YMG) and Bob(WA3WDR) at SpaceQuest to review the progress on the "core" of AMSAT-OSCAR-ECHO. First off — the big news: Dino (who is coordinating the launch arrangements) informed us that the launch date is set for March 31, 2004. The planned orbit will be ~800 km high and sun-synchronous. A total of (up to) ten satellites will ride to orbit. During the meeting we were able to view and exercise all the critical SpaceQuest-provided hardware systems arrayed as an open "flat-sat" on the bench for testing". Tom advised operators to look at this web site. http://www.pbase.com/tomcat/amsat_echo where you will find some selected photos of the hardware. He continues, "First you will see all the modules (except for the tray that will house the S-Band transmitter) laid out side-by-side on the bench. As a reminder, the trays are about 7"x7" in size and stack one on top of another to make up the cube-shaped satellite. One of the most exciting new innovations in Echo is the "programmable" attitude control magnet. In the past Microsats, gross attitude control has been achieved with fixed bar magnets — the attitude control magnet on Echo will "swap" the up/down faces of the satellite between users in the northern/southern hemispheres".

# Spotlight on SWLing

Robin Harwood VK7RH

## Sorry, I was wrong

I have to commence with an apology for recently writing that various clandestine stations targeting the Horn of Africa were coming from transmitters in Austria. Wolf Harrath, the recently retired DX Editor emailed me from the Austrian Radio (ORF) in Vienna to protest and yes I was wrong. It always pays to double-check my copy before sending off to the editor. Glenn Hauser who edits the World of Radio over various shortwave senders and Martin Schoech of the Clandestine Radio Watch also pointed out my glaring error. I should have said that most of these clandestine stations to this particular region seem to be from Juelich in Germany.

## Saving RFPI?

Yet another shortwave station may be history by the time this column is printed. You may heard Radio for Peace International from Costa Rica on non-standard frequencies adjacent to the 7 MHz amateur allocation, or on 15040 or 21845 all on USB. This station is located on the campus on a UN sponsored University for Peace in Costa Rica yet has been independent from it. Programming was mainly from alternative political and social groups in addition to some daily UN broadcasts. Most of these alternative groups are left of centre. Apparently the station never bothered to register their transmitters or frequencies with the Costa Rican government because they claimed to be on UN territory.

Recently the university administration changed their policy with a new chancellor and decided to overhaul the university and relations between the campus and RFPI deteriorated. The Costa Rican government was also annoyed when RFPI commenced broadcasting locally on FM without asking permission from the government first. In late July, the university placed armed guards and locked the RFPI studios and buildings, which were not owned by the university although on campus. Also a letter evicting RFPI from the campus was sent. There is a standoff with some locked in staff continuing to broadcast over shortwave and others unable to cross the locked gates. Also the station has been denied access to the Internet to download their programming. At present all I am hearing is appeals to save the station and asking supporters to protest to the UN Secretary-General.

## Unusual station

I am hearing a very unusual station on 5924 LSB from approximately 1200 most nights. It is broadcasting in a Chinese language probably Mandarin with three figure groups. I was tentatively able to identify the language from my Microsoft Encarta CD/ROM. There is a female announcer who gives out these numbers in a rather singsong voice. Each of the groups seems to be preceded by letters from the English alphabet eg MIT APN. I initially thought that the transmission was in an Indochinese language because there is a station on 5925 AM in Vietnamese from 1230 which turns out to be a shortwave relay of the Voice of Vietnam's Domestic Service from Hanoi. I have no idea where this numbers station is originating from although some are speculating it is from Taiwan.

## South Pacific

HCJB-Australia has recently retimed their evening South Pacific release and frequency to avoid co-channel interference from WYFR. They are now on 11750 instead of 11770 commencing at 0800 till 1200. They also have commenced a morning release from 1800 till 2030 on 11765 but it seems to me to be very bad timing, as it would be from 4 am till 6: 30 am EAST. This may be better when daylight saving is in, but the target is of course NZ and the Pacific Island and not necessarily Australia.

Well that is all for this month. ***Don't forget*** you can email any news or comments to me at vk7rh@wia.org.au.

**Robin VK7RH**

# Silent Key

# Eric Vidler VK2ZEV

### Birrong Sydney NSW

It is with regret that I have been informed of the passing of Eric VK2ZEV April 2003 in Sydney.

I first met Eric in 1953 while attending Newtown Tech School. I became interested in Amateur radio, my uncle owning DEITCH BROTHERS army disposal store in Oxford Street, Sydney. Also living in Marrickville a few doors from well known amateurs at the time, Ted VK2ABO and his brother Alf VK2AVI, was a good start to my long career in amateur radio. As Eric was working as a radio tech for ACE radio in the St. Peters store down the road from the School I was attending , we became good friends as I used to call in to the shop each afternoon after school.

After obtaining my AOLCP VK2ZXC, I soon became very interested in 2 and 6 metres prior to the establishment of repeaters. While Eric and I were modifying 522 transceivers for 2 metres and Farmer mobile am radios for 6 metres, we became frequent operators along with other 6 and 2 operators, to name a few: VK2ZVL, VK2ZVW, VK2ZGB, VK2ZDW, VK2ZIM, VK2ZTM, VK2ZSK, VK2ZAU. Eric was self-employed and worked as a TV technician for the best part of his working life living at Birriong western part of Sydney.

**Norman Deitch VK2ZXC**

# HF Predictions

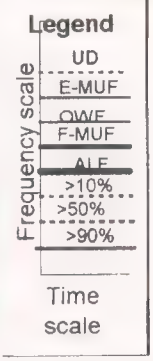
by Evan Jarman VK3ANI
34 Alandale Court Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.
These frequencies as identified in the legend are:-

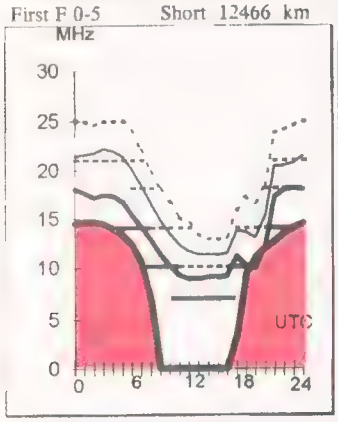
- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.
These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

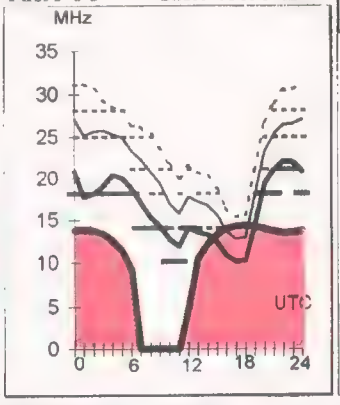
**September 2003**
T index: 56




**Adelaide-Anchorage 30**
First F 0-5 Short 12466 km




**Brisbane-Lima 122**
First F 0-5 Short 13056 km




**Adelaide-Budapest 305**
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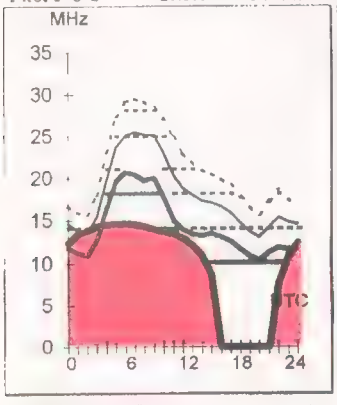


**Brisbane-London 147**
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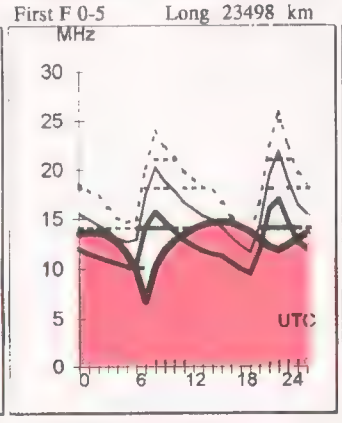
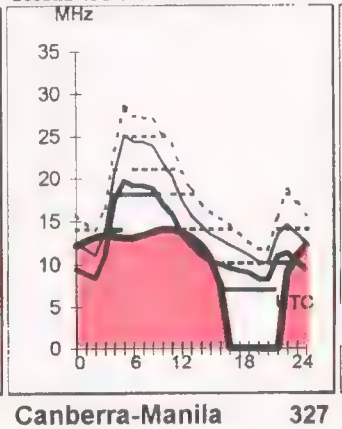
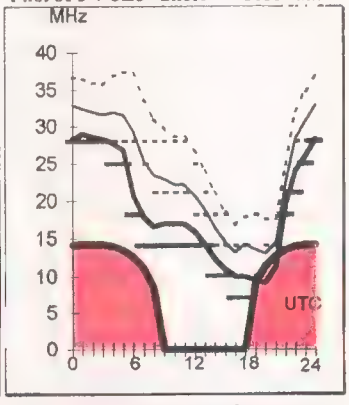


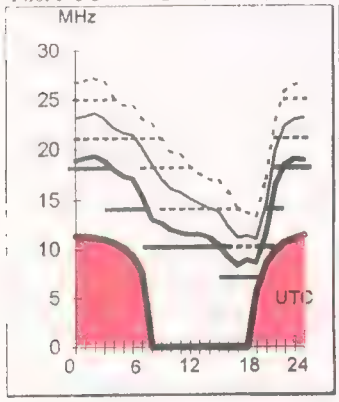

**Canberra-Lusaka 239**
Second 4F3-5 4 Short 11620 km



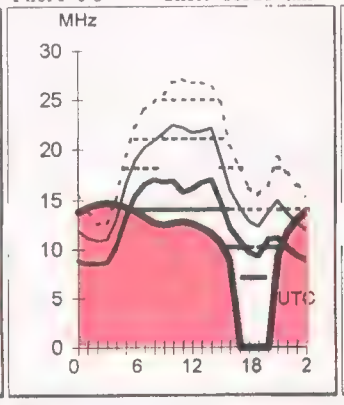

**Darwin-Honolulu 65**
First 3F3-7 3E0 Short 8635 km




**Adelaide-Suva 75**
First F 0-5 Short 4340 km




**Brisbane-London 327**
First F 0-5 Short 16526 km




**Canberra-Manila 327**
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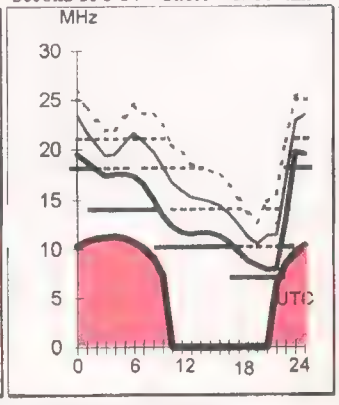
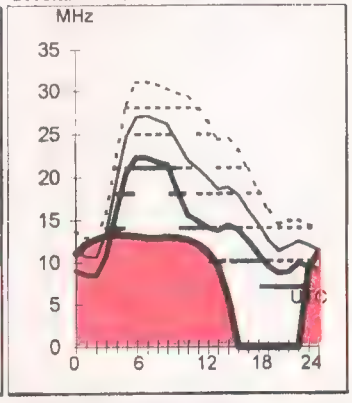
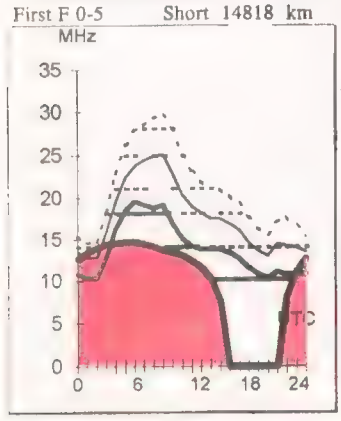


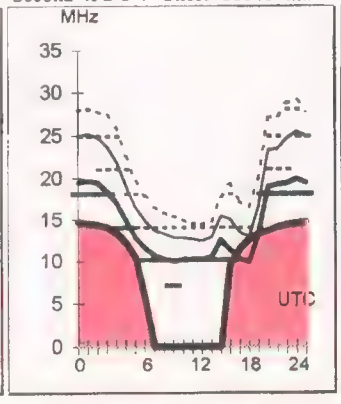

**Darwin-Johannesburg 241**
Second 4F4-6 4 Short 10639 km



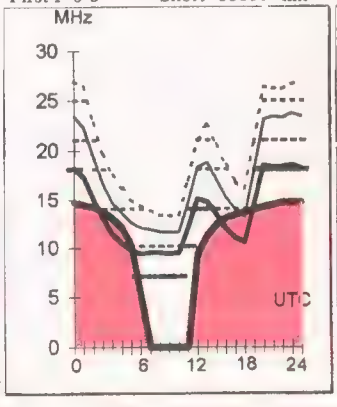

**Adelaide-Warsaw 312**
First F 0-5 Short 14818 km



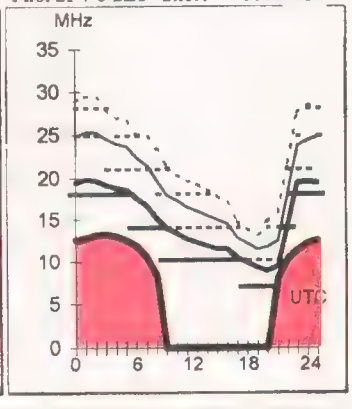

**Brisbane-Seattle 44**
Second 4F2-6 4 Short 11846 km



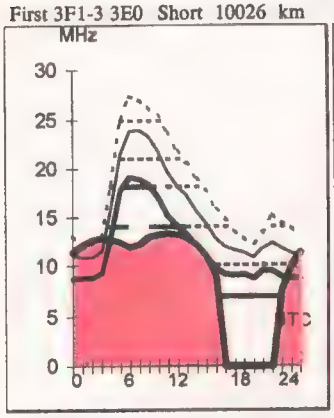

**Canberra-Ottawa 59**
First F 0-5 Short 16100 km



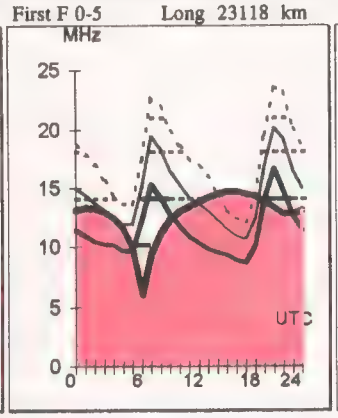

**Darwin-Wellington 135**
First 2F4-6 2E0 Short 5322 km



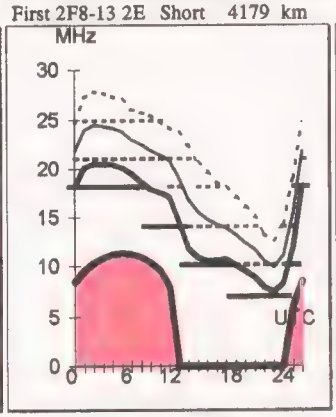
**Hobart-Capetown 220**
First 3F1-3 3E0 Short 10026 km



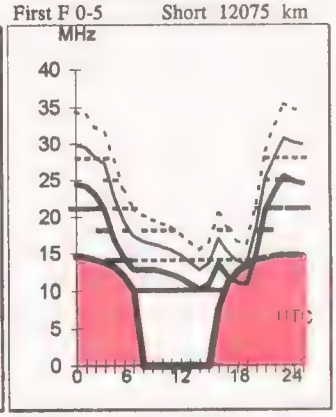

**Melbourne-London 131**
First F 0-5 Long 23118 km



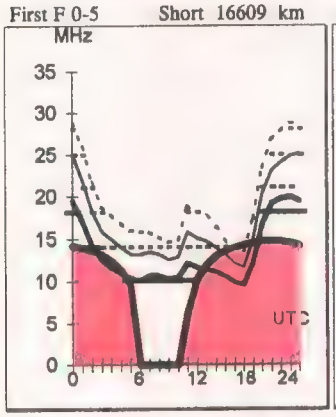

**Perth-Kuala Lumpar 336**
First 2F8-13 2E Short 4179 km



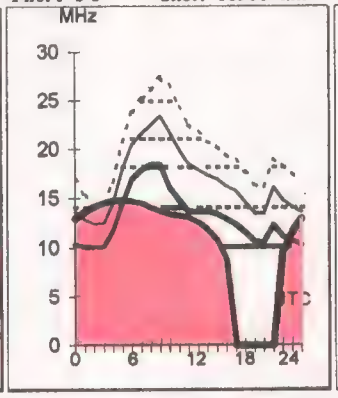

**Sydney-Los Angeles 61**
First F 0-5 Short 12075 km



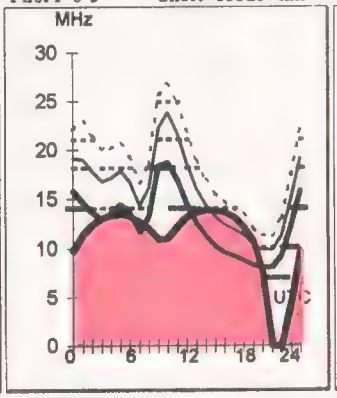

**Hobart-New York 80**
First F 0-5 Short 16609 km



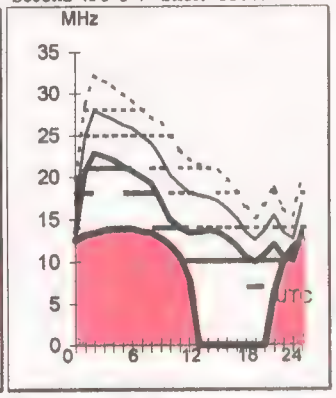

**Melbourne-London 311**
First F 0-5 Short 16906 km



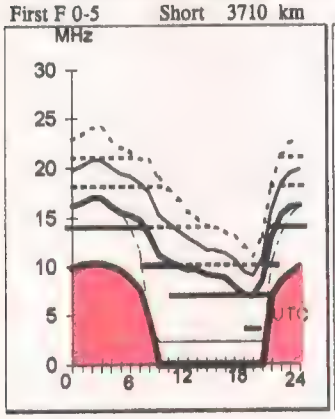

**Perth-RiodeJaneiro 203**
First F 0-5 Short 13523 km



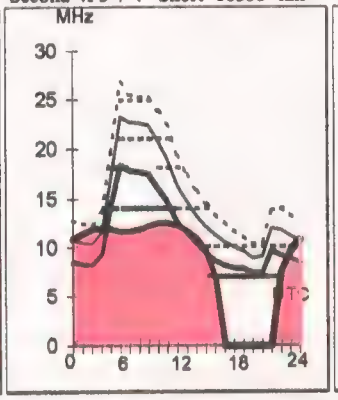

**Sydney-Rawalpindi 304**
Second 4F3-8 4 Short 11066 km



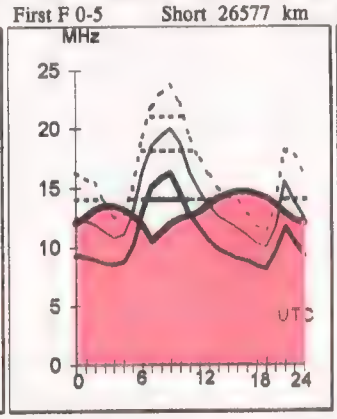

**Hobart-Port Moresby 360**
First F 0-5 Short 3710 km



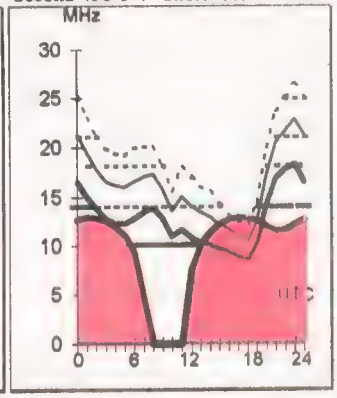

**Melbourne-Pretoria 234**
Second 4F5-7 4 Short 10353 km



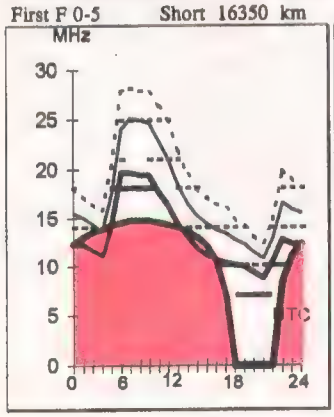

**Perth-Stockholm 144**
First F 0-5 Short 26577 km



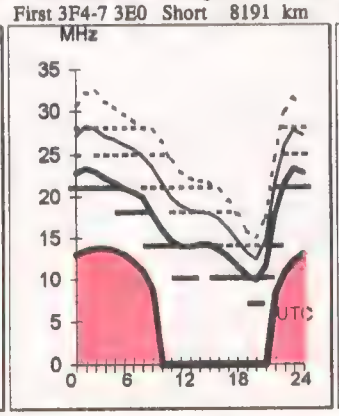

**Sydney-Santiago 145**
Second 4F3-5 4 Short 11347 km



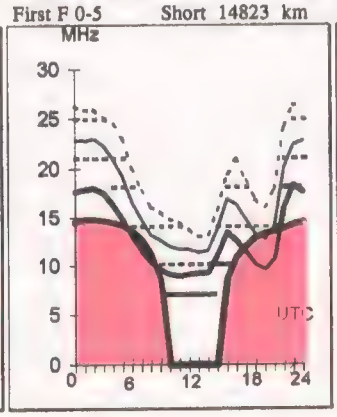

**Hobart-Rome 284**
First F 0-5 Short 16350 km



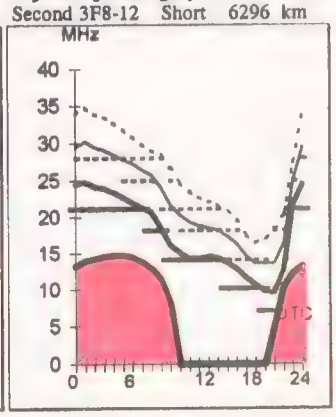

**Melbourne-Tokyo 356**
First 3F4-7 3E0 Short 8191 km




**Perth-Vancouver 50**
First F 0-5 Short 14823 km




**Sydney-Singapore 298**
Second 3F8-12 Short 6296 km



# VHF/UHF - An Expanding World

**David Smith VK3HZ**
vk3hz@wia.org.au

**Leigh Rainbird VK2KRR**
vk2krr@telstra.com

## Weak Signal

The generally poor band conditions on 2 m were brightened by an opening from Melbourne to the west on the evening of July 18th. Richard VK5USB to the north of Adelaide, Bill VK5ACY on Kangaroo Island and Roger VK5NY in Adelaide were worked by a number of stations in Melbourne and further east. This opening was exactly as predicted by the Hepburn VHF/UHF Tropospheric Ducting Forecast site (www.iprimus.ca/~hepburnw/tropo_aus.html) so it's worth keeping an eye on things even in the colder months.

Speaking of propagation predictors, a presentation given at the recent GippsTech conference sparked the interest in this area. Jim VK3ZYC spoke of using weather radar anomalous propagation as an indicator of band conditions. The web site www.weatherzone.com.au provides almost realtime weather radar information from around Australia (you do have to register first). When conditions are good, the radars can receive anomalous returns from long distances displayed as activity on the Lightning Tracker screen. However, there is no corresponding cloud cover shown on the Current Weather screen. These anomalous returns are due to reflections from much more distant objects being returned to the radar during the following pulse period. We need some good conditions so that this can be examined in more detail.

Robbie VK3EK with his Wednesday evening Net on 144.150 is still attracting a crowd and it is good to see some newcomers appearing on the SSB end of the band including David VK3ZDR in Geelong and Mike VK3UBM in Hawthorn. Mike initially came up with his FT-817 into a vertical whip in his flat and was able to work the Melbourne stations but no further. The next week, encouraged by the results, he'd built a 3 element beam and managed to work down to Moe. Who knows - before long he might have 4 x 13 el and an AM17 – we can only hope!

Rex VK7MO has also joined in on the Wednesday evening activity, although in a different way. He will be active most Wednesdays from 2030 AEST beaming towards Melbourne using JT44 on 144.225 or 432.225. He has already managed to consistently work Chas VK3BRZ, David VK3XLD and Charlie VK3FMD on 70 cm.

## EME

Following Guy VK2KU's words on EME and digital modes, there have been a number of people enquiring about EME operation. There is an excellent article called "Getting Started on 2 Meter EME" written by Bob Kocisko K6PF and available on the net at www.gm4jjj.co.uk/K6PF/k6pf.pdf. The references in the article also point to a number of other excellent EME web sites from the likes of W5UN, N1BUG, GM4JJJ and others.

One thing to consider before diving into building and erecting an EME-capable station is the band on which you will operate. While 2 m seems to be the most popular band, at least in terms of active operators, 70 cm should be given careful consideration. Whether you are building or buying equipment, 2 m and 70 cm are probably on par. However, on 70 cm, antenna arrays are smaller and less visually dominating (important in an urban environment), TVI is less of an issue (again important with the neighbours) and the sky is much quieter. It's worth considering.

## Microwave

There seem to be lots of construction projects happening at the moment – possibly something to do with winter. A number of 10 GHz operators in Melbourne and Gippsland are following the lead from the Western Districts and are building gear for 24 GHz. This was helped along by the appearance recently on the US EBay site of a number of 1 W 24 GHz amplifier modules. A bulk lot of these amplifiers has found its way to VK3 and will be put to good use. All have now gone unfortunately.

Stations in North America are exploiting a different form of propagation enhancement to extend their operating distances. VE4MA in Winnipeg recently worked W0ZQ/0 in Minneapolis on 10 GHz rain scatter over a distance of 635 km. Severe thunderstorms were occurring at the time in northern Minnesota in a direct line between the two stations. Signal reports varied between S7 and S9 with the typical rain scatter (aurora like) tone. This contact appears to be a new US to Canada 10 GHz record. The Australian 10 GHz record currently stands at 1912 km for a contact between VK5NY/5 and VK6KZ/6 in 1994.

**PLAN AHEAD**

**Jambouree On The Air JOTA 18 - 19 October**

# 2 m & 70 cm FM DX

What an adrenalin rush it is to come home in the evening, switch the transceiver on to find repeaters, many hundreds of kilometres away, being received full scale on the meter.

This is what happened when I arrived home on Friday evening, 18th July. This is one duct opening I won't forget, and being the middle of winter, it was most exceptional. As soon as the radio was switched on there was a signal from the Ararat 2 m repeater (410 km) which was full scale. After the scan resumed the radio stopped on 146.900, Mt Gambier (630 km) which was S9+20dB, just magic. More on this opening later in this month's report.

It was reasonably quiet during July in the southeast and I have had no reports from other corners of the country.

In the evening on Wednesday the 9th July there was slight enhancement around central VK3 and a duct showing in eastern VK5 areas. Brian, VK5ZMB in Gawler reports good 70 cm conditions across the two Gulfs to Port Lincoln and into Berri on 2 m. David, VK5HDW in Millicent was able to get to Ararat on 2 m and also reported good 70 cm conditions.

The big one for the month began building up from around Monday the 14th with good high pressure cells dominating the weather charts, and clear skies with relatively calm days. A front moved through around Tuesday night but was kept relatively confined to the south and luckily dissipated quite quickly. Conditions were slightly enhanced most of the week and things remained calm enough so the duct was able to reach a workable level on the afternoon of Friday the 18th. Some great signals were passed between a number of stations taking advantage of the rare conditions.

VK5ZMB Brian reports that from his QTH near Adelaide he was able to work a number of 2 m repeaters across Victoria, including Mt.Macedon, Ararat and a few other Melbourne repeaters. These work out at around the 600 km mark for Brian, who has just recently got his 8 element vertical yagi in the air, which already seems to be paying dividends. Brian was also able to work simplex on 2 m to VK2KRR near Wagga at 764 km and reported hearing the Wagga 2 m repeater but being unable to work it.

Contact was made simplex from John VK5NJ in Mt. Gambier to VK2KRR near Wagga on both 2 m and 70 cm (632 km), with received signals from VK5NJ peaking at 5/6 on 70 cm and 5/7 on 2 m. A great effort from John who I believe was running only an omni directional antenna on 70 cm, whereas I was running a 27 element ATN yagi.

The only other significant simplex contact I heard of was between Greg VK5THA and VK2KRR. Greg is located in Northfield, near Adelaide; this was 771 km and the furthest simplex contact noted.

Most distant repeaters worked on 2 m from here at VK2KRR were VK5REP at Cowell on 146.800. At 961 km this was rather difficult to access and only lasted about 5 minutes. Aside from this, Port Augusta VK5RAE was relatively easy to get with 5 watts at 910 km. VK5RAH was quite good at 747 km using only 6 watts. Mt. Gambier at one stage was easy on only 2.7 watts at 630 km.

A good run on 70 cm repeaters using only a single ATN antenna produced great results. VK5RAD in Adelaide on 438.575 (764 km), VK5RSB in Summertown on 438.125 (760 km) and VK5ROH in Mt. Gambier on 438.575 (630 km) could all be accessed.

A path to at least one area of VK5 was present all through the night and most of Saturday, weakening significantly at 11am. Weak signals persisted from the likes of Murray Bridge, Lobethal and Port Augusta most of the afternoon until, at 7.30 pm, they were gone.

Its great to hear of a growing number of stations getting the DX bug and organising new antenna set-ups and experiments to further improve their station ability; including VK2PDW in Wagga, VK3EME in Bendigo, VK7HDM Gagebrook, VK1TB in Canberra and VK3HGC in Wangaratta.

FM DX Season Tally Competition Logs are being accepted during the first week of each month. If you are just starting out or updating your existing tally, please send it by email to vkvhffmdx@bigpond.com. You can also view the updated tally table at www.users.bigpond.com/vkvhffmdx. With enough log submissions we will print some results every few months in AR mag.

**Silent Key**

# Doug Sim VK4BP

All of us at the Sunshine Coast Amateur Radio Club were greatly saddened to hear of the sudden death of our fellow club member, Doug Sim, VK4BP, on the 23rd of May, 2003. Doug and his XYL June, VK4SJ, were on a DX-pedition to the Cook Islands, when Doug was involved in a head on collision between his motor scooter and a van.

For most of his working life, Doug was an electrical engineer officer with the Merchant Navy. He worked on bulk carriers, container ships and oil tankers, such as the BP Enterprise and the BP Endeavour. He was delighted to obtain the call VK4BP, which was a constant reminder of his happy years on the BP Tankers. Together, Doug and June shared their Ham Radio interests, which took them to many parts of the world, visiting and playing host to many of the friends they made "on air".

Doug left us doing what he enjoyed, in a place he really loved. He leaves behind a host of happy memories and a life well lived. Our deepest sympathy is extended to June, Anthony, Andrew and the family. Vale Doug Sim VK4BP.

# Opinion

**Ian Jackson VK3BUF**
Education Officer, Gippsland Gate Radio & Electronics Club inc. (GGREC)
ianjackson@netspace.net.au
(03) 5625 2545, Drouin West, Vic.

# Examining the examinations

**This article relates to the examination process for Amateur Radio operators. It also highlights the need for change in the process in order to improve access and convenience for Amateur Radio Examination candidates.**

## The existing system:

The present system for Amateur Radio examinations has been in place (with few changes) since the process was passed to the W.I.A from the then Dept. of Communications. The process now relies upon a relatively small number of registered examiners to stage exam events, at infrequent intervals, in conjunction with various Clubs and Zone.

A person, having studied the exam syllabus, may then express a desire to attempt one of the theory or regulations exams. That person must then make contact with a certified Club or Zones and apply for an exam.

In some areas these exams can be conducted for individuals upon request. More typically, that person must wait until several candidates can apply so that a multi-candidate event can be staged. This usually implies a wait of 1 to 2 months. The minimum notice for an exam event is approximately 10-14 days so that applications can be processed and exam papers ordered and dispatched. After the exam event, the typical response time for the marking and dispatch of the results is around 21-28 days. (Much longer if the papers are being marked over a Christmas break.) Then, once all appropriate forms and photographs are sent to the ACA, a successful candidate must wait a further 14 to 21 days to receive their Operators License.

Consequently, a candidate must wait between 56 and 100 days before they can get on air *if they are successful.* Unsuccessful candidates may have to go through this 56 to 100 day cycle several more times before all subjects are passed. Notwithstanding the difficulty level of the exam, the *actual exam process* is the biggest disincentive we have for people contemplating the acquisition of an Amateur Radio License.

A major change in the examination process is needed, and it should happen in conjunction with the other proposed license changes presently being considered.

## What I propose is this:

- We retain (or expand) our present list of examiners with the various clubs and divisions.
- An Internet site is established with a range of on-line exams for both theory and regulations. These will be real exams with on-line marking facilities, but they can only be conducted by the authorised examiners.
- To stage an event a PC with simple web cam attached to the USB port is needed. The web site is accessed, a (modest) fee is collected from the candidate, the examiners check the candidate I.D., they enter these details (with their individual passwords) into the system, along with a head & shoulders image from the web cam of both the candidate and the examiners. The Web-Exam is then conducted under examiner supervision, similar to the way it is supervised now and a Pass/Fail result appears on screen.
- If they fail, the attempt is logged with the web site and the candidate can try again at the examiners' convenience. The next day or week – whatever.
- If they pass, they get to select a callsign from the on-line database and a 14 day license falls out of the adjacent printer, complete with photo. The successful candidate then leaves the ACA license fee with the examiners, signs the appropriate form and goes home with a valid callsign.
- The examiners then forward the completed application to the WIA federal office, who retain an exam fee, confirm all identities (with the pics on the screen) and simply forward the license application portion to the ACA who generate a formal certificate & license to post to the candidate in the normal fashion. (The ACA would probably prefer to receive these applications as a regular bundle from a single source rather than intermittent correspondence they receive now from around the country.)

With such a system the workload in the W.I.A federal office is greatly reduced, as other than collecting statistics they only need to perform a small amount of work processing *successful* candidates. Exam events can be far more spontaneous, requiring a lead time that is limited only by examiners' convenience. Exams could be held in the corner of a Club meeting venue, a Hamfest sale or special event. If Internet access is difficult, most provincial libraries would be cooperative in providing the quiet on-line environment needed to stage an exam. (Many libraries encourage this sort of use of their resources.)

This will make a *big* difference to the number of exams being held, for less workload. Even when candidates fail, there will be reduced stress and tension as they walk away with the result, rather than waiting a month for news of failure.

(Over many years I have seen the present process infuriate many genuine would-be amateurs to the point that they have walked away from the entire hobby in disgust.)

Another aspect of this proposal is the additional interest it will generate. Amateurs pride themselves on embracing new disciplines, Internet based exams would be an example of sensible use of this new technology.

The difficulties involved are minimal and the return, in the form of more licensed amateurs, would be achieved without affecting the integrity of the process or the subject matter.

ar

## Leading the horse to water doesn't necessarily make him thirsty

53 years of involvement in and with amateur radio doesn't automatically confer the wisdom of Solomon on a contributor to a debate which in part, and one way or another, has been going on since the mid 30s. Back then amateurs were arguing whether it was best to make your own components, or buy factory made gear such as was available. The subject is peripheral to current licensing argument but the connotations have a familiar ring.

Messrs Linton and Harrison have (April AR) mounted a detailed but simplistic view that updating syllabi and throwing open amateur bands will, in some miraculous way, entice new-comers to the hobby — somewhat analogous to going to the doctor with an undefined symptom and getting the response "take an aspirin or two and it will probably be right in time". This proposed "fix" would seem to have been initiated by amateur organisations other than our own. The net result appears to barely take into account the root causes for lack of technical interests and then suggesting a possible solution to ease the pain.

Seven and one half pages have been devoted to "outlining a bit of history " as they put it, and just 26 para lines page 17 vaguely touching on the real problem and then taking a quantum leap into suggesting an apparent fix, then one can be excused for offering a somewhat different interpretation. The prevalent view seems to be that by revitalising licensing requirements, offering band frequency sharing- there will be a rush of amateur band communicators, suddenly imbued with a technical awareness skill which will impress government spectrum administrators and fulfil the unexpressed aim of increased radio society membership — for those who are impressed sufficiently to want to join.

The sad bit is that leading the horse to water doesn't necessarily make him thirsty. The basic tenets of amateur radio as espoused on the rear page of " AR" under the masthead Division Directory appear to be forgotten but fervently hoped for, one suspects, by those by adopting the "aspirin" approach. But are there additional inputs that can be organised into a potential fillip to the cause?

We are all aware of the decline in technical interests, and not only in amateur radio.... the demise of technical literature/magazines such as "Ham Radio", manufacturers like Heathkit, non availability of useful components to roll your own creations are a reflection on the culture that has developed for decades.

One cannot escape the influence of television, a medium basically providing entertainment - by and large it is and has been a disappointment and has not provided answers or the stimulus for youthful minds that should be stimulated to find out more about the technical world around them unless one happens to be a devoted follower of archaeology or prehistoric animal life. Television and more lately computers have dominated leisure time activities supplanting more scientific activities. The dissemination of popular and not so popular scientific thought and encouragement has been a haphazard affair, guided by a few discerning teachers, parents and acquaintances who can recognise a latent interest.

### Market and sell the product

Television— If we are living in the "knowledge economy" why not use the medium suffering the disparaging comment made earlier.

Consider:

1. Seek sponsorship of both commercial and public TV to run technically oriented programs but not necessarily radio based.
2. Work with school/TAFE educators to get approved courses that are meaningful to augment standard set curricula.
3. Seek government grants or other financial aid to set up amateur radio at education facilities.
4. Establish working exhibits on any electronic topic on a permanent and semi-permanent basis with coverage by aforementioned TV channels. Encourage the theme "see it and go out and do it"

In short, use whatever material/ media/ opportunity is available to tell the world what you have.

Idealistic? Impractical? — as James Bond said "never say never" This is a whole lot better and capable of greater far reaching results than the dubious expedient of fiddling with a concept to get the numbers\.

Of course any meaningful approach along these or expanded lines can only take place with a united front- something recent political leaders have been careful to encourage.

As long as this Institute suffers the factions inherent in state fiefdoms, little change to the status quo can be expected. - a national funded discrete identity has to be forged, but that topic has been well aired in previous years- with little change.

The technical culture too, has to be changed; not by the equivalent of throwing money at a problem and hoping it will be fixed -" culture is a phenomenon perceptible out of the corner of one's eye and manifested in gestures such as the freedom HP and 3M allow for unsupervised research acknowledging that innovation springs from curious tinkering as well as from concerted research and development" (quoted from The Age Review by Gordon Haigh).

This desirable outcome can only be achieved if future interest in the hobby rises above the common place of emphasising primarily, communication.

**Pete D Williams VK3IZ**

**Views expressed in the 'Opinion' and 'Over to you' columns are those of the authors, and do not necessarily reflect the policies of the Wireless Institute of Australia.**

**Send contributions to:**

**The Editor**
**Amateur Radio Magazine**
**34 Hawker Crescent**
**Elizabeth East SA 5112**

**or email:**

**edarmag@chariot.net.au**

# Hamads

### FOR SALE NSW

• **SB-220** linear amplifier 2kW, mint cond, manuals, spare 3-500z $950. Also **Hygain TH-3** antenna, near new, stainless hardware, manuals $300. VK2JAU Phone 02 9636 6061.

• **Superior ham residence**: 20 m steel tower, outboard ham shack, city views, 3 b/ room, large kitchen, family room, air-cond, quiet location, Greystanes $440k VK2JAU Phone 02 9636 6061

• **Kenwood TS-440S** s/n 6060081, **MC-80** mic power supply. Station monitor **SM-200.** Dummy load 100 W & 1000 W. **Hansen peak power meter.** Offers VK2DTR Phone 02 9918 3835.

• **Tower,** gal steel, triangular 570 mm per side, 8 sections each 3m long very strong, ex Telstra $300. John VK2ZHM QTHR Phone 02 9417 5338, mitchell@zeta.org.au

### WANTED NSW

• **HF beam 10/15/20 m**. Mosley, Hy-gain, Cushcraft, anything considered. Heavy duty rotator. Complete unit would be great. Arthur VK2PE, Phone 02 6552 4694, Email: aparcher@dodo.com.au.

### FOR SALE VIC

• **KLM KT-34A** 4 element tri band beam $400. **Cushcraft D-40** 40 m rotable dipole $250. **Hygain quad** $175. **Tri band** beam $150. Trapped vert $50. **8 element 2m beams** $50. **11 element UHF beams** $50. Some require work ring for details. Also copies of AR, ARA etc, free. David, Phone 0439 316 702 or 9786 6323 Seaford.

• **Westinghouse transistor 8** portable b/c radio circa 1950 in leatherette case. Mint condition, $15. Max, Phone /fax 03 5985 2671.

• **Collins 32S-1** in VGC with original op manual $500. **Collins 75S-1** also in similar condx $450. Further description and pix available http://www.vk3rx.com/ Ebay profiteers need not apply. Damien VK3RX Phone 03 5427 3121 Email vk3rx@wia.org.au.

• **Varactor tripler** machined silver plated module, 500/1500 MHz , 15 W in, 7.5 W out, 1N5150 diode, plus RF driver amp, 2W/15 W, 470-520 MHz, BLX93/94 , nom 24 V operation, supplied with tech docs. $30 Terry VK3ZXY QTHR Phone 03 9592 3514, email vk3zxy@leithy.com.

• **Ham gear from three amateur stations.** Please phone, write, or email, for lists of Tx, Rx, Antennae, and Test gear, and/or books, and/or Tx and Rx Valves. Bruce VK3QC. QTHR. Phone 03 5762 6540, bplowman@bigpond.com

• **YAESU FL-2100Z** HF Amplifier. GC $500. Contact VK3MW, Phone 03 59787177 or jandrg@alphalink.com.au

### WANTED VIC

• **SM-220** station monitor, **SP-430** external speaker, **MC-60A** microphone, **E31-2154-05** calibration cable, **CW filter** for TS-680S. Steve Algar Phone 03 5941 1680.

• **AR-8** HF receiver and/or companion AT-5 transmitter. Clem Smith VK3AYY, Box 365, Lakes Entrance 3909, fax 03 9725 5230, Phone 0417 574 456.

### FOR SALE QLD

• One **GELOSO VFO** in good condition, no paper work and complete with valves. Merv. Deakin VK4DV, Phone 07 4928 5537.

### WANTED QLD

• **Copy of driver software** for HP scanner model Scanjet plus HP9195AB floppy disk or CD ROM. Gwen VK4CB Phone 07 3202 7137.

### FOR SALE SA

• **Diamond CX-401** 4-way antenna switch with surge protection $100. **Diamond CX-301** 3-way antenna switch $50. **MFJ-1702** 2-way antenna switch $25. 2 x **Yaesu YO 301** station monitors $250 ea. **HAL Telereader CWR-6800** CW/RTTY terminal with built-in 5 inch monitor incl keyboard, 12 V power supply and additional 12 inch monitor $390. **HF linear amplifier CE-5000E** (details see AR April 2003). Prices are negotiable, plus postage. Harro VK5HK Phone 08 8323 9622.

### WANTED SA

• **Information on Marconi receiver model HR-110**. VK5RG QTHR Email gurrrc@picknowl.com.au,

• **Service manual** and/or circuit diagram of a Philips GM3121 grid dip

• oscillator. Contact Christopher.VK5ZST, Phone 08 8520 2988,

### WANTED WA

• A copy of the **ARRL book 'Solid State Design for the Radio Amateur'** by Wes Hayward W7ZOI and Doug DeMaw W1FB, published in 1977. Please help - contact Steve VK6VZ, Phone 08 9298 9330 or at sire@iinet.net.au

### FOR SALE NT

• Small Wonder Labs **PSK-20 Transceiver Kit**, unassembled **20 metre PSK transceiver** complete with the optional case, $150. **ICOM OPC-589** Microphone Adapter Cable, 8 pin modular to 8 pin microphone, new in packaging, use with ICOM IC706, others? $25. JJ VK8JJ QTHR, Phone 08 8953 0065 or vk8jj@ozemail.com.au

### TRADE ADS

**PSK-31, SSTV, RTTY SOUNDBOARD**
Interfaces Fully isolated, ready to plug in. http://www.G3LIV.CO.UK, johnny@melvin.com, G3LIV QTHR.

## About hamads....

- Hamads may be submitted by ***email*** or on the ***form on the reverse of your current Amateur Radio address flysheet.*** Please print carefully and clearly, use upper AND lower case.
- Separate forms for For Sale and Wanted items. Please include name, address STD telephone number and WIA membership number if you do not use the flysheet.
- Eight lines (forty words) per issue free to all WIA members, ninth and tenth lines for name and address. Commercial rates apply for non-members.
- Deceased estates Hamads will be published in full, even if the ad is not fully radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising (Trade Hamads) Pleae contact Newsletters Unlimited
- Copy typed or printed clearly please, and received by the deadlines shown on page 1 of each issue of Amateur Radio.

**Email:** ***newsletters@ozemail.com.au*** **Fax:** ***03 9756 7031***

**Postal:** ***Newsletters Unlimited, PO Box 431, Monbulk Vic 3793***

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It is impossible for us to ensure that the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore, advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are strictly complied with.

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**Agencies**

Active Electronics, Tas
Truscotts, Electronic World, Melb.
TTS Systems, Tyabb ( VIC)
Tower Communications, Perth


### MISCELLANEOUS

• **FREE coaching** via mail and email by professional radio engineer. All theory subjects in all licence grades and upgrades. Lindsay Lawless VK3ANJ Box 760 Lakes Entrance Vic.3909 and email: linlawless@net-tech.com.au

• **The WIA QSL Collection (now Federal) requires QSLs.** All types welcome, especially rare DX pictorial cards, special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765, tel. (03) 9728 5350

### GROW WIA—MAKE IT YOUR JOB

**RECRUIT A NEIGHBOUR*, NON-MEMBER LICENSE HOLDER TODAY.**

One to one approaches are very successful and it is in your interest to have a strong WIA.

If you need to know who your neighbouring operators are call John (03) 9756 7797 AH and he'll tell you.

## *"Hey, Old Timer..."*

**If you have been licensed for more than 25 years you are invited to join the**

## Radio Amateurs Old Timers Club Australia

or if you have been licensed for **less than 25 but more than ten years**, you are invited to become an **Associate Member** of the RAOTC.

In either case a **$5.00** joining fee plus **$8.00** for one year or **$15.00** for two years gets you two interesting OTN Journals a year plus good fellowship.

Write to

RAOTC,
3/237 Bluff Road
Sandringham VIC 3191

or call Arthur VK3VQ on **03 9598 4262** or Allan VK3AMD on **03 9570 4610**, for an application form.

# *Join* WIA *today*

**"There is no denying that radio today still has all the magic that attracted people to the hobby all those years ago, when it first emerged onto an unsuspecting world."**

**Ernie Hocking, President**
Amateur Radio April 2002

## WIA *is active in:*

- **QSL services**
- **Major role in amateur radio education**
- **Coordination of contests and awards**
- **Monitoring of illegal activity**

## How to join WIA

- **Through your local amateur radio club**
- **Through your Division (contact details on page 56)**
- **Contact WIA Federal Office (03) 9528 5962**

# Division Directory

*The Amateur Radio Service exists for the purpose of self training, intercommunication and technical investigation. It is carried out by amateurs who are duly authorised people interested in radio technique solely with a personal aim and without pecuniary interest.*

The Wireless Institute of Australia represents the interests of all radio amateurs throughout Australia. National representation is handled by the executive office under council direction. There is one councillor for each of the seven Divisions. This directory lists all the Divisional offices, broadcast schedules and subscription rates. All enquiries should be directed to your local Division.

**VK1 Division** Australian Capital Territory,
GPO Box 600, Canberra ACT 2601

| | | |
|---|---|---|
| President | Alan Hawes | VK1WX |
| Secretary | Deane Walkington | VK1DW |
| Treasurer | Linden Orr | VK1LSO |

**Broadcast schedules** All frequencies MHz. All times are local.

VK1WI transmits each Thursday evening at 2000 hrs local time on VK1RGI 146.950 MHz and 438.375 MHz including the linked repeater system on VK2RGN Goulburn, VK2RHR High Range, VK2RMP Madden Plains and VK2RTW Wagga Wagga. VK1 Home Page *http://www.vk1.wia.ampr.org*

**Annual Membership Fees.** Full $80.00 Family $38.75 Pensioner or student $71.00. Without *Amateur Radio* $48.00

**VK2 Division** New South Wales
109 Wigram St, Parramatta NSW
(PO Box 432, Harris Park, 2150)
(Office hours Tue., Thu., Fri., 1100 to 1400 hrs.)
Phone 02 9689 2417
Web: *http://www.wiansw.org.au*
Freecall 1800 817 644
e-mail: *vk2wi@wiansw.org.au*
Fax 02 9633 1525

| | | |
|---|---|---|
| President | Brian Kelly | VK2WBK |
| Secretary | Owen Holmwood | VK2AEJ |
| Treasurer | Noel May | VK2YXM |

VK2WI transmits every Sunday at 1000 hrs and 1930 hrs on some or all of the following frequencies (MHz): 1.845, 3.595, 7.146, 10.125, 14.170, 18.120, 21.170, 24.950, 28.320, 29.170, 52.150, 52.525, 144.150, 147.000, 432.150, 438.525, 1273.500. Plus many country regions on 2m and 70cm repeaters. Highlights are included in VK2AWX Newcastle news Monday 1930hrs. on 3.593 , 10 metres and local repeaters. The text of the bulletins is available on the Divisional website and packet radio. Continuous slow morse transmissions are provided on 3.699 and 145.650. VK2RSY beacons on 10m, 6m, 2m, 70cm and 23cm. Packet on 144.850.

**Annual Membership Fees.** Full $80.00 Pensioner or student $63.00. Without *Amateur Radio* $50.00

**VK3 Division** Victoria
40G Victory Boulevard Ashburton VIC 3147
(Office hours Tue 10.00 -2.30)
Phone 03 9885 9261
Web: *http://www.wiavic.org.au*
Fax 03 9885 9298
e-mail: *wiavic@wiavic.org.au*

| | | |
|---|---|---|
| President | Jim Linton | VK3PC |
| Secretary | John Brown | VK3JJB |
| Treasurer | Jim Baxter | VK3DBQ |

VK3BWI broadcasts on the 1st Sunday of the month at 20.00hrs Primary frequencies, 3.615 DSB, 7.085 LSB, and FM(R)s VK3RML 146.700, VK3RMM 147.250, VK3RWG 147.225, and 70 cm FM(R)s VK3ROU 438.225, and VK3RMU 438.075. Major news under call VK3ZWI on Victorian packet BBS and WIA VIC Web Site.

**Annual Membership Fees.** Full $83.00 Pensioner or student $67.00. Without *Amateur Radio* $51.00

**VK4 Division** Queensland
PO Box 199, Wavell Heights, Qld. 4012
Phone 07 3221 9377
e-mail: *office@wiaq.powerup.com.au*
Fax 07 3266 4929
Web: *http://www.wia.org.au/vk4*

| | | |
|---|---|---|
| President | Ewan McLeod | VK4ERM |
| Secretary | Bob Cumming | VK4YBN |
| Treasurer | Bill McDermott | VK4AZM |

EVERY SUNDAY, at 9am LOCAL (Sat 2300 UTC). From Far North Queensland On 7.070/2 MHz. From South East Queensland:- 1.825, 3.605, 7.118, 10.135, 14.342, 21.175, 52.525, 147.000, 438.500 MHz. Right throughout VK4 scan 146.6 to 148.0 MHz again at 9am local. SUNDAY 6:45pm hear LAST week's QNEWS broadcast 3.605 and 147.0 MHz from South East Queensland. MONDAY 7:00pm hear YESTERDAY's news again on 146.875 MHz broadcast from Brisbanes Bayside repeater, and then 7:30pm on 3.605 and 147.0 MHz from Sth East Queensland. Text editions on packet internet and personal email, visit www.wia.org.au/vk4 News is updated 24/7 in both text and audio on this site. MP3 Audio from same website by 2300 hours each Saturday. Contact QNEWS, packet sp QNEWS@VK4WIE.BNE.QLD.AUS.OC email qnews@wia.org.au

**Annual Membership Fees.** Full $95.00 Pensioner or student $81.00. Without *Amateur Radio* $69.00

**VK5 Division** South Australia and Northern Territory
(GPO Box 1234 Adelaide SA 5001)
Phone 08 8294 2992
web: *http://www.sant.wia.org.au*
email: *peter.reichelt@bigpond.com*

| | | |
|---|---|---|
| President | Trevor Quick | VK5ATQ |
| Secretary | Peter Reichelt | VK5APR |
| Treasurer | Trevor Quick | VK5ATQ |

VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.

**Annual Membership Fees.** Full $88.00 Pensioner or student $73.00. Without *Amateur Radio* $58.00

**VK6 Division** Western Australia
PO Box 10 West Perth WA 6872
Phone 08 9351 8873
Web: *http://www.wia.org.au/vk6*
e-mail: *vk6@wia.org.au*

| | | |
|---|---|---|
| President | Neil Penfold | VK6NE |
| Secretary | Roy Watkins | VK6XV |
| Treasurer | Bruce Hedland-Thomas | VK6OO |

VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz, Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury).147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900,147.000, 147.200, 147.250 and 147.350 MHz..Also in "Real Audio" format from the VK6 WIA website

**Annual Membership Fees.** Full $71.00 Pensioner or student $65.00. Without *Amateur Radio* $39.00

**VK7 Division** Tasmania
PO Box 371 Hobart TAS 7001
Phone 03 6234 3553 (BH)
Web: *http://www.wia.org.au/vk7*
email: *vk7dg@useoz..com*

| | | |
|---|---|---|
| President | Phil Corby | VK7ZAX |
| Secretary | Dale Barnes | VK7DG |
| Treasurer | Dale Barnes | VK7DG |

VK7WI: At 0930 hrs every Sunday on 146.700 MHz FM (VK7RHT, Hobart) and relayed on 147.000 MHz FM (VK7RAA, Launceston), 146.625 MHz FM (VK7RMD, Ulverstone), 146.750 MHz FM (VK7RNW, Ulverstone), 147.075 MHz FM (VK7RWC, Rosebery), 3.57 MHz LSB, 7.090 MHz LSB, 14.130 MHz USB and UHF CB Channel 15 in Hobart area.

**Annual Membership Fees.** Full $90.00 Pensioner or student $77.00. Without *Amateur Radio* $57.00

**VK8** Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown, received on 14 or 28 MHz. The broadcast is downloaded via the Internet.

# GASS: bigger and better than ever!

**Learning about Amateur Radio at the Great Australian Science Show (GASS) 2003**

The amateur radio display at the Great Australian Science Show (GASS) 2003 was an enormous success, and a credit to those involved.

WIA Victoria and four of its affiliated metropolitan clubs – EMDRC, GGREC, RWARC and NERG –combined their resources to mount the display on the Saturday, Sunday and Monday 16-18 August, at the Melbourne Science Museum.

GASS, which included numerous displays by a range of organisations, was held in conjunction with National Science Week.

Unfortunately this year it conflicted with both the WIA Remembrance Day Contest, and the International Lighthouse Weekend, making it a little harder to get volunteers who were not committed to those other activities.

Due to the environment and other restrictions in the museum, HF radio is not possible. However, 2 m and 70 cm beams were hung from the ceiling above the amateur radio display. A tripod mast with a 70 cm beam was erected for use on the IRLP.

In addition to IRLP, there were two FM92s on 2 m, feeding dummy loads that enabled communication across the display area by visitors.

Other aspects of the display were:

- Antique crystal sets including one set in a milk carton
- A radio connected to an oscilloscope to display modulation
- Some antique transmitters
- An exploded mobile phone mounted on a board with appropriate labelling
- QRP HF transceivers
- Various pieces of ARDF equipment
- A computer Morse code program with a paddle and a hand key

The walls were covered with photos, posters, award certificates and QSL cards. The front table had a DVD presentation on all aspects of our great hobby with plenty of give away pamphlets promoting radio clubs and the WIA.

Attendance over the three days was good, with plenty of questions asked about our hobby.

The WIA Victoria Council thanks the clubs who took part in this event that is a major public relations exercise for our hobby.

# ICOM'S GREAT CHAMPIONS

LC156 - Multi-bag for IC-703

## IC-703 New HF/50MHz All Mode Transceiver.

Fully portable operation • Built-in antenna tuner • DSP capability • 1.8 - 54 MHz coverage • 10W variable step power • Current consumption control • Battery pack and portable antenna available

## IC-2720H The new dual band FM Transceiver

2M / 70CM • Remote head operation • Dual VFO with independent control for each band • 212 Memory channels • Wideband receiver • CTCSS & DTCS encode & decode • 9600 bps packet operation • Standard HM133 remote control microphone

## IC-7400

Sharp & soft IF filter shape • 100W HF /6m /2m • Digital twin PBT • DSP • SSB / CW synchronous tuning • Built in antenna tuner • RTTY demod / decoder • Digital RF speech processor • Microphone equaliser.

## IC-208H 2m FM Dual Band Transceiver

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